DOCUMENT RESUME

ED 441 078 CE 080 075

AUTHOR	Asensio, Mireia, Ed.; Foster, Jonathan, Ed.; Hodgson, Vivien, Ed.; McConnell, David, Ed.
TITLE	Networked Learning 2000: Innovative Approaches to Lifelong Learning and Higher Education through the Internet. Proceedings of the International Conference (2nd, Lancaster, England, April 17-19, 2000).
INSTITUTION	Sheffield Univ. (England). Dept. of Educational Studies.; Lancaster Univ. (England).
ISBN	ISBN-0-902831-38-0
PUB DATE	2000-04-00
NOTE	404p.; Financial support provided by UK Joint Information Systems Committee, UK Teaching and Learning Technology Programme, and UK University for Industry.
AVAILABLE FROM	Dept. of Educational Studies, University of Sheffield, 388 Glossop Road, Sheffield S10 2JA, UK (35 British pounds plus postage and packing).
PUB TYPE	Collected Works - Proceedings (021)
EDRS PRICE	MF01/PC17 Plus Postage.
DESCRIPTORS	Adult Programs; Adult Students; *College Programs; Communication Research; Computer Uses in Education; *Distance Education; Educational Practices; *Educational Technology; Foreign Countries; Higher Education; *Internet; *Lifelong Learning; Networks; *Teaching Methods
IDENTIFIERS	United Kingdom

ABSTRACT

This document contains 59 papers presented at a conference in England on approaches to lifelong learning and higher education through the Internet. Representative papers include the following: "The University of the Highlands and Islands Project: A Model for Networked Learning?" (Veronica Adamson, Jane Plenderleith); "The Costs of Networked Learning--An Interactive Workshop" (Charlotte Ash, Paul Bacsich); "An Investigation and Design of Networked Learning in Inner-City Leeds" (Tim Barker, Rachel Pilkington); "Institutional Readiness for Implementing Network Technology" (Aidan Black, Hazel Derbyshire, Jackie Knowles O'Keefe, Phil Poole, Merce Rius Riu, Jie Shen); "Effective Delivery of On-Campus Networked Learning: Reflections on Two Case Studies" (John Cook, Tom Boyle); "A Methodological Approach to Networked Collaborative Learning: Design and Pedagogy Issues" (T. Daradoumis, J. Marques); "Teaching and Learning Computing Skills via an Intranet-Based Course" (Adrian Friday, Alan Parkes, David Nichols); "Project Work in Networked Distance Education" (Morten Knudsen, Jan Helbo, Lars Peter Jensen, Ole Rokkjaer, Ole Borch, Jorgen Ostergaard); "Networked Learning in Virtual Environments" (Anni Koubek, Sandra Kober); "Networked Learning in Applied Science Education" (Jutta Pauschenwein, Anni Koubek); "Creating Effective Online Collaborative Educators" (Gerard A. Prendergast); "Staff Development for Networked Distance Education" (Sue Tickner); and "Evaluating an Open University Web Course: Issues and Innovations" (Martin Weller, Robin Mason). Most of the papers contain references; many include abstracts. (KC)

Reproductions supplied by EDRS are the best that can be made
from the original document.

ED 441 078

Second International Conference

networked learning 2000

Innovative Approaches to Lifelong Learning and Higher Education Through the Internet

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY
McConnell/ Hodgson
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
1

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☑ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

Proceedings of the Second International Conference jointly organised by Lancaster University and the University of Sheffield, and held at Lancaster University
17th–19th April 2000

Edited by: Mireia Asensio, Jonathan Foster,
Vivien Hodgson and David McConnell

BEST COPY AVAILABLE

CE080075

LANCASTER
The University of Sheffield
Department of Educational Studies

Sponsored by The University for Industry and the JISC and TLTP3 Programmes

ISBN : 0 902831 38 0

Copyright 2000 : Lancaster University and University of Sheffield

NETWORKED LEARNING 2000

Innovative Approaches to Lifelong Learning and Higher Education through the Internet

Proceedings of the 2000 International Conference jointly organised by Lancaster University and the University of Sheffield held at Lancaster University, April 17th-19th 2000

Edited by : Mireia Asensio, Jonathan Foster, Vivien Hodgson and David McConnell

Contents

Page No.

1. **The University of the Highlands and Islands Project: A model for networked learning?** 1
Veronica Adamson and Jane Plenderleith

2. **Changing Concepts and Educational Paradigm in the Frame of ODL** 7
Pia Guttorm Andersen and Ole Hansen

3. **Is There a Difference? Contrasting experiences of face to face and online learning** 12
Mireia Asensio, Vivien Hodgson and Kiran Trehan

4. **POSTER PRESENTATION**
Choosing NVivo to Support Phenomenographic Research in Networked Learning 20
Mireia Asensio

5. **The Costs of Networked Learning – An interactive workshop** 21
Charlotte Ash and Paul Bacsich

6. **POSTER PRESENTATION**
Building a Distributed, Asynchronous Learning Environment 27
Colin Baldwin

7. **An Investigation and Design of Networked Learning in Inner-City Leeds** 28
Tim Barker and Rachel Pilkington

8. **POSTER PRESENTATION**
Choosing a Virtual Learning Environment for the University of Bristol 37
Sian Bayne, Julian Cook and Ros O'Leary

9. **Institutional Readiness for Implementing Network Technology** 38
Aidan Black, Hazel Derbyshire, Jackie Knowles O'Keefe, Phil Poole, Merce Rius Riu and Jie Shen

10. **Networked Professional Development: Issues for recipients and providers** 49
Nicholas Bowskill, Jonathan Foster, Vic Lally and David McConnell

11. **What are the Implications of the Virtualisation of Organisations and the Emergence of Knowledge Management for Management Development?** 57
John G Burgoyne

12. **Effective Delivery of On-Campus Networked Learning: Reflections on two case-studies** 64
John Cook and Tom Boyle

13. **A Methodological Approach to Networked Collaborative Learning: Design and pedagogy issues** 72
T Daradoumis and J M Marquès

14. **On-Line Learning: Frontiers in the creation of learning communities** 78
Mike Davis and Kate Denning

Page No.

15. **Student Approaches to Networked Learning and the Role of Evaluation** 86
Gabi Diercks-O'Brien and Terence Karran

16. **Introducing Networked Learning with Human Resource Development Professionals Internationally** 94
Catherine Edwards

17. **Negotiating Practice: An analysis of an institutional dialogue about networked learning** 98
Jonathan Foster, Nicholas Bowskill, Vic Lally and David McConnell

18. **Teaching and Learning Computing Skills via an Intranet-Based Course** 106
Adrian Friday, Alan Parkes and David Nichols

19. **Activating the Web as a Virtual and Dynamic Learning Environment** 114
Colin Fryer

20. **As Simple as Possible, as Complex as Necessary: An approach to the design and development of web-based learning environments** 122
Julian Halliwell

21. **Identifying the Qualities needed for a Virtual Learning Space in Communication and Information Technology Skills** 127
Rachel A Harris, Márcia A Pereira and Duncan Davidson

22. **Changing Concepts of the Boundaries within ODL** 139
Vivien Hodgson

23. **Equal Opportunities for Networked Learners** 145
Barbara Howell

24. **Understanding Students' Experiences of Collaborative Networked Learning** 152
Christopher R Jones

25. **Networked Learning for Post-Graduate Supervisors** 159
Peter Kandlbinder

26. **Embedding Key Skills into the Curriculum through Networked Learning: An evaluation of implementation strategies** 163
Helen Keighley and Gabi Diercks-O'Brien

27. **Project Work in Networked Distance Education** 170
Morten Knudsen, Jan Helbo, Lars Peter Jensen, Ole Rokkjær, Ole Borch and Jorgen Østergaard

28. **Talk to Me! Real-Time Audio-Conferencing and the Changing Roles of the Teacher and the Learner in a 24/7 Environment** 178
Markus Kötter and Lesley Shield

29. **Networked Learning in Virtual Environments** 186
Anni Koubek and Sandra Kober

Page No.

30. **Universities and Knowledge Economies: A paradigmatic change?** 192
Gerard MacDonald

31. **An Evaluation of Stage One: The impact of introducing web-based learning technologies on post-secondary teaching and learning processes** 199
V MacSwain, D Mattock and W Robertson

32. **Organizational Change and Networked Learning: A structurational model** 205
Stewart Marshall and Shirley Gregor

33. **Argumentative Interaction in an Academic E-mail Course** 212
Miika Marttunen and Leena Laurinen

34. **The Practice of Networked Learning: Experiences of design and participation** 220
David McConnell, Nick Noakes, Patricia Rowe and William Stewart

35. **"Let's Be Careful Out There!" – Learning in the world of electronic information** 229
Liz McDowell and Alison Pickard

36. **A Case Study of Inter-Institutional Collaboration – A tale of two cities?** 236
D McFarlane, V Cano and K Brown

37. **POSTER PRESENTATION**
An Exploration of Language Use in the context of CMC 241
Jane Miller, Alan Durndell, Mike Wrennall and Terry Mayes

38. **Learning Using Virtual Shared Workspaces** 242
Gerardo Moënne, Sally Barnes and Rosamund Sutherland

39. **Romanian Universities Face to the Networked Learning Reality** 249
Cristina Mohora, Constantin Ispas and Miron Zapciu

40. **"Deep" Learning and Computer Mediated Communication: A case study of on-line teacher education** 254
Gary Motteram and Joanna Teague

41. **'Empowering Online ESL Learners' Reflections on the Experience of Developing an Existing Undergraduate Course from a Classroom-Based to a Predominantly Network-Based Environment** 261
Nick Noakes

42. **WOLF (Wolverhampton Online Learning Framework)** 269
John O'Donoghue, Liz Fleetham, Colin Dalziel and Steve Molyneux

43. **Networked Learning in Applied Science Education** 280
Jutta Pauschenwein and Anni Koubek

44. **Evaluating CHAT Seminars within a WebCT Networked Learning Environment** 286
Rachel M Pilkington and Catherine L Bennett

45. **Creating Effective Online Collaborative Educators** 293
Gerard A Prendergast

Page No.

46. **Driving Across Stepping Stones** 299
Gilly Salmon

47. **Developing a System to Assure the Quality of ICT Learning Materials to Enhance Lifelong Learning** 307
Sally Sambrook, Susan Geertshuis, David Cheseldine and Rob Willis

48. **Individual Approaches to Studying and the Affordances of Interacting with Networked Learning Environments** 315
Keith Smyth and Kathy Buckner

49. **POSTER PRESENTATION** 323
Problems at Crumpton
Alan Staley and Niall MacKenzie

50. **Tackling the Issue of Student Motivation through Educational Technology: An action research model** 324
John Steel and Graham Holden

51. **POSTER PRESENTATION**
Participants' Perceptions of using Computer Mediated Communication (CMC) as Part of a Distance Master's Programme in Educational Technology and English Language Teaching 330
Joanna Teague

52. **Staff Development for Networked Distance Education** 332
Sue Tickner

53. **POSTER PRESENTATION**
Networked Learning in Professional Education Using Virtual Enterprises 339
V C Vescoukis, S Retalis and S Michiotis

54. **European Trade Union Distance Education: Potential and problems** 341
S Walker and L Creanor

55. **Networked Communication and the Collaborative Development of Written Expression at Key Stage Three** 354
S Aisha Walker and Rachel M Pilkington

56. **Evaluating an Open University Web Course: Issues and innovations** 361
Martin Weller and Robin Mason

57. **Web-Based Learning: Size matters** 369
Peter Williams

58. **On-Line Learning Using Broadcast Materials: Case study of the BBC on-line learning pilot programme in women's health** 374
Sheena Banks and David McConnell

59. **European Co-Operation through "Interactive Storytelling" in the European Virtual Training College** 381
Christoph Harnischmacher and Ulrich Rauter

Acknowledgements

REVIEW PANEL

Reviewing Editors : Mircia Asensio, Jonathan Foster, Vivien Hodgson, David McConnell

Review Panel : Sheena Banks, Nick Bowskill, Peter Goodyear, Chris Jones, Vic Lally, Chris Steeples

CONFERENCE TEAM

Conference Planning : Mircia Asensio, Jonathan Foster, Vivien Hodgson, David McConnell

Conference Secretaries : Teresa Wisniewska, Colleen Woodward

Website Manager : Jonathan Foster

We would like to acknowledge the financial support of the following :

UK Joint Information Systems Committee

UK Teaching and Learning Technology Programme

UK University for Industry (who sponsored the publication of the Conference Proceedings).

Whilst every effort has been made to ensure the accuracy of the information in this publication, the publishers cannot accept any responsibility for errors & omissions.

KEYNOTE SPEECH

The role of a university in a dot com society: what is it?

Dale Spender, April 2000
Lancaster

Abstract

Knowledge is one thing that has changed in a knowledge society; yet knowledge is the one commodity in which the university deals.

Whereas knowledge was used to organise the production of goods and services in the industrial age, knowledge is the wealth generating product in the information age.

So how have the universities adjusted to this new form of knowledge making which integrates learning and earning? Do universities have a knowledge policy – and an IP policy that realises their potential?

Can universities meet the challenge of the corporate universities, and for profit providers, which are able to integrate the work with the learning? Without extensive bricks and mortar?

Are universities part of the global knowledge society – and if not, what is their future?

The University of the Highlands and Islands project: a model for networked learning?

Veronica Adamson and Jane Plenderleith

Veronica Adamson
Learning Resources Coordinator
University of the Highlands and Islands project

Dr Jane Plenderleith
Curriculum Development Coordinator
University of the Highlands and islands project

Introduction

The Highlands and Islands of Scotland are a remote and rugged expnase of land on the periphery of Britain and Europe. The region has long struggled against the adversity of isolation – geographic, economic and social – and has endured significant economic decline and depopulation. The area, from Shetland to the Mull of Kintyre, from the Western Isles to the foothills of the Cairngorms, comprises nearly twenty per cent of the land mass of Britain. It has less than one per cent of the UK population (fewer than half a million inhabitants) and as such is one of the least densely populated areas of Europe. With the exception of the conurbation of Inverness, which is one of Europe's fastest-growing towns and currently bidding for city status, most of the inhabitants live in small and widely dispersed towns, villages and crofting communities. At the 1991 census there were ninety-three inhabited islands in archipelagos of Shetland and Orkney, and the Inner and Outer Hebrides.

The region has long suffered from a lack of critical mass to support services and facilities, inexorably exacerbated by concomitant emigration and population decline. In the nineteenth century, people and communities were forcibly cleared to be replaced with sheep. In the twentieth century, the traditional micro-industries of fishing and farming have been eroded in the face of strong national and international competition. Many of the region's young people have sought education and careers outside the region, particularly true of those seeking higher education opportunities. Indeed, historically, a significantly high proportion of the region's youth have entered higher education. During the early 1980s, when fourteen per cent of school-leavers in England were entering higher education, and the figure for Scotland as a whole was twenty-one per cent, the percentage figure for the Highlands and Islands was a staggering thirty-two per cent[1].

However, all of the twenty-two current universities and institutions of higher education in Scotland lie in, or close to, the more densely populated triangle formed by the cities of Aberdeen, Edinburgh and Glasgow. Young people in search of an education had to leave, and once departed, they seldom returned.

The idea that the Highlands and Islands of Scotland deserve a university of their own is not a new one. Sir Thomas Urquhart published his plans for higher education of the young men of Cromarty[2] as early as 1653. In a paper headed 'On Education' and probably dated around 1706, Sir George Mackenzie, First Earl of Cromartie, put forward his own proposals a proto-university based in Inverness. The curriculum was to include instruction for women in morality, and weekly 'publick lessons', perhaps an early example of adult continuing education[3]. More recently, another bid for Inverness under the 1964 Robbins expansion failed in the face of competition from Stirling, and to the dismay of many outside the central belt, Scotland's newest university of the time was established close to all the others.

In 1992, the year when the Further and Higher Education (Scotland) Act brought the total of Scotland's Higher Education Institutions to the present twenty-two, Sir Graham Hills, former Principal and Vice Chancellor of the University of Strathclyde in Glasgow, proposed to the then Highland Regional Council a model university based on a multi-campus partnership of local institutions. The blueprint was for a university that would be regional in terms of being both *in* its region and *of* its region[4].

One of the most significant and far-reaching aspects of the Hills vision was the new learning paradigm it proposed for higher education in the Highlands and Islands. Drawing on Gibbons' et al *The New Production of Knowledge*[5], Hills advocates the alternative 'mode 2' basis for undergraduate education. 'Mode 2' as a learning mode as opposed to 'mode 1' as a teaching mode should be the defining pedagogical impetus behind the new university in the move towards a 'learning society'[6].

Evolution of the Project

In 1993, Highlands and Islands Enterprise established the University of the Highlands and Islands project (UHI), charged with the task of establishing a university in and for the Highlands and Islands of Scotland. It was indeed to be a new university for the twenty-first centary, a collegiate federation linked by a powerful information and communications highway. Its pedagogical approach was not to be based on traditional distance learning modes and models. The fundamental concept of UHI was that individuals should be able to engage locally in learning despite their distant location: that people and places should be linked in community learning networks, operating collectively as a single university entity.

At the time of writing, UHI is a federation of thirteen institutions of further and higher education, being local authority operated (such as Orkney and Shetland Colleges), larger, incorporated further education colleges such as Inverness, Perth and Moray Colleges, industry-funded institutions like the North Atlantic Fisheries College, privately-funded colleges such as the Sabhal Mor Ostaig Gaelic College on Skye and the Highland Theological College, and two research institutions, being the Scottish Association for Marine Science near Oban and Seafish Aquaculture on Ardnamurchan.

Provision exists, and negotiations are underway, for the addition of new partners: Lochaber College based at Fort William currently holds UHI Associate Institution status. Many of these academic partners in UHI also operate micro-networks of learning centres making provision available to small and geographically dispersed communities. The recent securing of significant European funding will facilitate a strategic and consolidated approach to community learning networks across the area.

UHI's development trajectory has been steep and swift. In 1996, the Millennium Commission awarded £33.35 million to enhance the physical estate and infrastructure of the UHI project. In 1998 UHI achieved the significant step of accreditation by the Open University Validation Services (OUVS) for the validation of its provision. At the end of that year a formal request was submitted to the Secretary of State for Scotland to be designated an institution of higher education.

It is worth pausing here to note the comparative speed of these developments. From the time of the initial conception of a university for the Highlands and Islands of Scotland to the establishment of the UHI Project Office, almost four hundred years have elapsed. The Project is charged with establishing the said university within four years, a tall order by anyone's standards. Clearly, achieving the vision of a regional university both in and of its geographical area requires careful planning in terms of its curriculum content, the methods by which that content will be delivered, and the assurance of quality of the learning experience across the entire spectrum of provision. Not least the issues of sustainability and long-term funding require consideration and planning.

Curriculum

The UHI curriculum has been developed through consultation of subject experts in the academic partners with appropriate community, business and industry interest groups. A number of Curriculum Development Working Groups were established in 1997 with a tripartite remit. Their first task was to consider existing staff expertise, resource availability and curriculum provision throughout the network of academic partners. Their next task was to identify gaps in this provision and areas for the further development of a higher education curriculum, with due cognisance of student and employer needs, staff expertise and learner support requirements. On the basis of these two activities, their third and final task was the recommendation of the development of provision to fulfil these identified curricular needs, along with identifying the human and material resources required for this. Recent academic restructuring has subsumed these working groups into five new UHI Faculties, charged with the task, among others, of continuing and refining curriculum developments.

In addition to the five Faculties, four research schools have been established, and a number of PhD studentships sponsored. This is an ambitious project designed to cultivate and enhance indigenous research and development for the Highlands and Islands. UHI academic staff too are encouraged to engage in programmes of higher study and continuous professional development. The paradigm shift required by staff experienced in the design and delivery of programmes of further education to the more learner-centred, independent approaches demanded by a higher education curriculum and methodology is recognised, and significant support accorded to the achievement of this shift.

In accordance with the principles recommended by the Garrick report for Scotland to the National Committee of Inquiry into Higher Education[7], UHI has developed a range of broad-based three-year bachelors degrees (Scottish ordinary degrees) with a vocational emphasis. While Academic Council, UHI's senior academic body, has recently agreed the development in principle of selected honours provision across a range of curriculum areas, honours delivery is on hold pending an established quality track record of quality delivery. An important element in UHI's curriculum developments at present is the integration of existing Higher National Certificate and Diploma awards into a unifying modular structure and quality assurance procedures.

The degree awards developed by UHI reflect the intention to establish high-quality higher education provision for the region, and to tailor this provision specifically to the region's needs. Developments in business administration, for example, place significant emphasis on the small and medium-sized enterprises that constitute the vast majority of active businesses in the area. Information and communications technology is an important and integrated curriculum focus, as well as a means of facilitating its delivery. The acquisition of transferable skills is recognised as vitally important for businesses that rely on all-rounders rather than specialists.

Applied science developments in fisheries, land management, forestry and marine ecology are all designed to meet specific industry-oriented economic needs. Sustainable development, rurality and environmental management are recurrent themes in the UHI curriculum. Provision in tourism, leisure and hospitality management addresses issues particular to the Highlands and Islands in the context of generic industry and commercial needs, concerns and policies.

There are substantial collaborative curriculum ventures with Scandinavia, the Arctic and the North Atlantic Rim, where common issues of isolation, rurality and sustainability are paramount. The importance of the transferable skills required by the lifelong learner in the economic marketplace of the twenty-first century is reflected in the formal integration of personal and professional capabilities into all modules and programmes of the UHI undergraduate curriculum.

Delivery

Much deliberation and analysis has taken place with regard to the delivery of the UHI curriculum. The need to deliver courses of learning to a variety of learners in a range of settings is fundamental. There is a plethora of learning centres across the area, ranging from state-of-the-art college-based learning resource centres to community-based multi-purpose meeting-places. These learning centres have different names, different types of owner, ranges of uses and funding mechanisms. Currently there are approximately fifty learning centres, offering a range of provision in a variety of ways. One of the current developmental imperatives for UHI is the mapping of these centres and the activities which take place and may take place there, and the establishment of a baseline quality threshold for learners across the region.

Embedded in the basic definition of a learning centre as a place where individuals can go to engage in learning are certain assumptions that may be expressed as learner entitlements, being: access to a computer with a connection to the UHI wide area network; access to a tutor and a student adviser; access to materials; access to a learning space. Whatever the mode of delivery, the learning experience depends on resources. A common definition of a learning resource would generally refer to the way in which the content is packaged, such as in print, CD-ROM or audio-visual format. However, in the context of UHI and networked learning, a wider categorisation of a learning resource is proposed, one that takes into consideration the mutual interdependence of the human, material and environmental resources required for meaningful community learning. In 1999, the UHI Learning Environment and Technologies group published its report 'Towards a Learning Strategy for the University of the Highlands and Islands'[8], referred to internally as the LET Report. This has been an important document for staff across the network engaged in developing a higher education curriculum for networked delivery, and allows an insight into the kind of learning strategies and methodologies that are envisaged for the emerging university.

Discussion

There is, then, considerable evidence not only of the need for a university in and for the Highlands and Islands of Scotland, but also of the successes to date of the UHI project and the federal academic partners in working towards this goal. There is also a long way to go in a number of key areas.

Already there is evidence of UHI's success in addressing the needs of the lifelong learner in the Highlands and Islands. According to 1997 statistics, UHI Academic Partners were already providing a locally developed community curriculum to a student population of almost six thousand students, of whom around half are part-time learners. In terms of equality of educational opportunity, there is a near equity in male/female balance, more than fifty per cent of learners are over twenty-five, and over eighty per cent are local to their academic partner institution. These are early, positive indicators that UHI is addressing the issues of social exclusion and geographical isolation in a context of lifelong learning. However, little evidence is available to date of the extent to which UHI is meeting the higher educational needs of all its constituents from all sectors of the community, particularly ethnic minority groupings. A highly sophisticated Equal Opportunities Policy has been developed. If successfully implemented, this detailed policy, compiled through consultation with recognised experts from a wide spectrum of interest groups, should lay a foundation for equality of representation for all social and ethnic groupings in the higher education community of the Highlands and Islands.

In February 1999, UHI launched its unique 'Linguistic and Cultural Identity Policy' which pledged to give equal weight and import to five indigenous 'languages' of the Highlands and

Islands, and the different cultural groupings they represent. UHI recognises English and Gaelic as formal languages for curriculum delivery and assessment. Sabhal Mòr Ostaig College on Skye conducts all its business through the medium of Gaelic, and significant proportions of the curriculum at other academic partners are delivered and assessed in Gaelic. The recently implemented UHI Library Management System, a uniquely distributed system which has unionised the disparate library catalogues of all academic partners in the federation, has a bilingual English/Gaelic interface. The other 'languages' identified in the UHI Linguistic and Cultural Identity Policy – Scots, Orcadian and Shetlandic – are not recognised in the library management system, nor in quality assurance and academic management procedures.

The issue of long-term recurrent funding and the sustainability of curriculum developments and delivery modes and methods is plainly crucial for the future of the project. Student uptake of the higher education curriculum is mainly at levels 1 and 2 (HNC and HND) with few students currently engaged on degree-level programmes. Significant sums of money have been invested in the development for delivery of relevant and accessible programmes of study, in terms of the development of curriculum content, quality assurance systems and structures, staff development and learning resource provision. A return on this investment in terms of student recruitment, enhanced employment opportunities and economic improvement is plainly required. There is a clear need for enhanced local, national and international recruitment and awareness-raising strategies.

A further challenge for the near future is the achievement of the aims set and the methodologies proposed in the 1999 LET Report. Much work still remains to be done in the establishment and monitoring of community learning networks, the development and implementation of the resources and environments they require, the learning activities that will take place, and the impact of the centres and the learning on the communities of learners and the learners themselves. It is to be hoped that the interests of the students and communities of the region will prevail in meaningful research and development of strategies and methodologies for the most effective matching of individual learners with content, mode and learning media.

Student feedback from the 1998/99 academic session indicates that while ICT is recognised as an important and integral part of the UHI curriculum and its delivery, some assumptions have been made about the propensity of all students, particularly mature learners, to develop and exercise the necessary ICT skills with sufficient speed and alacrity. There are warning bells to be heeded here for those responsible for managing the UHI learning experience. It is an established tenet of educational hermeneutics that the human mind thinks with ideas, not with information[9 10]. There are dangers inherent in basing the use of computers in education on the outmoded view of human beings as information processors. For meaningful learning, experience and ideas must be privileged over technologised knowledge, and UHI must remain true to its principle that the communities drive the curriculum which drives the technology.

There is some potential tension between two current drives within UHI: the drive to take the curriculum to the communities, and the drive for degree awarding powers and university status. The former must not jeopardise the latter; the latter should not stifle the former. In the context of her analysis of post-Dearing academic management structures, Susan Weil offers the following telling comment on the pitfalls of complex committee structures that UHI would do well to avoid: 'Within the formal system of universities, committees lumber on, often upholding rigidities and unspoken assumptions, and seldom functioning as sites for a critical scrutiny of the limitations of existing epistemologies of practice.'[11] UHI is perhaps uniquely positioned in the context of British higher education to implement the kind of organisational structures that will promote stability in diversity, and the ability to respond swiftly and meaningfully to changing social and economic conditions. Public and sectoral scrutiny is intense; the courage of conviction is required.

The people of the Highlands and Islands have waited a long time for 'their university' and they want it 'now'. There is a clear need to turn the rhetoric of community learning networks into real places where meaningful and relevant learning can be engaged in by the people who want it. For the moment, considerable efforts are being exerted in the realisation for this new millennium of a seventeenth-century vision.

References

[1] Hills, G (1997), 'The University of the Highlands and Islands: Scotland's first regional university', in *A Future for Scottish Higher Education*, ed. Crawford, Committee of Scottish Higher Education Principals, p87

[2] Op cit, p89

[3] Clough, M. (1990), *Two Houses*, Aberdeen University Press, p157f

[4] Hills, op cit, p86

[5] Gibbons, M., Limoges, C., Nowotny, H., Schwartzman, S., Scott, P., Trow, M. (1994) *The New Production of Knowledge*. The dynamics of science and research in contemporary societies, Sage, London

[6] Hills, op cit, p95

[7] Dearing, R (1997) *Higher Education in the Learning Society*, HMSO, London

[8] Learning Environments and Technology Working Group (1999) *Towards a Learning Strategy for the University of the Highlands and Islands*, UHI, Inverness http://www.uhi.ac.uk/LET_Report.html

[9] Capra, F. (1996) *The Web of Life*, Anchor, Doubleday, New York

[10] Weil, S (1999), 'Re-creating universities for 'beyond the stable state': from 'Dearingesque' systematic control to post-Dearing systemic learning and inquiry', in *System Research and Behavioural Science: Special Edition on Dearing and Higher Education*, Vol.16 No.2 http://www.northampton.ac.uk/solar/dearing.html

[11] Weil, op cit, p5

Changing concepts and educational paradigm in the frame of ODL.

Pia Guttorm Andersen and Ole Hansen, TESS Network®

Under the motto: "Knowledge without frontiers" TESS Network® has developed new ways for the educational thinking. The project, SocraTESS ODL Network, which is founded by the Socrates programme, ODL action is an example on how the use of open and distance learning (ODL) has played a part in creating change and development in both the traditional in-service training of teachers as well as in the teaching methods and their attitude towards educational change.

SocraTESS ODL Network

The project is a European collaboration centred around in-service training of teachers from basic schooling (primary and lower secondary) based on an open and distance learning environment (ODL). The collaboration uses as its starting point work with educational integration. The collaboration comprises 13 partners from 11 countries.

The aims and objectives of the project is:

1. to develop and carry out an ODL course: Teaching Children to Read on effective strategies in the teaching of beginner readers, in the light of the international reading survey (IEA,1994).
2. to develop a pedagogical network and on-line service for teachers in Europe.
3. to implement a co-operational model between educational institutions in Europe with regard to the development of ODL-based teaching material, including the development of a model of how qualifications achieved with the help of ODL can be evaluated.

The primary phase for basic schooling: teachers and pupils in basic schooling, school psychologists, pedagogical consultants and school heads. The number of people who has benefit of the project through active participation and circulation of results is 200 people.

The project's pedagogical approach

SocraTESS ODL Network has further developed an in-service training concept, which was started under the Nordic Council of Ministers, HELIOS I & II and the HORIZON initiatives.

The concept consists of three levels:

A. The general reflective level, where teacher groups (course participants) from the same school work together with teacher groups from other schools on a given course module and the problem issues to be dealt with on the course. A tutor will be attached to this level, preferably one of the designers of the course.

B: The specializing and deeper-going level, where teachers (course participants) with a particular interest can enroll in a study group with a specific special-needs problem issue which, for example, might have been revealed through work on level A.
A person with a special insight into the problem issue raised will be attached to this level, and the teachers (course participants) will be arranged in study groups with colleagues from near and far. At this level an international perspective will be introduced into problem issues, which are specific to the SEN field.

C: The theory-into-practice and problem-orientated level, where teachers (course participants) organize and execute agreed educational projects (with pupils as a target group). Opportunities for collaboration between the schools will be translated into practical terms and the exchange of experiences will occur as a part of the daily practice. An on-line project advisory service will be attached to this level.

The project's pedagogical method has been chosen and developed on the basis of a requirement that the project's end-user group, teachers in basic schooling, must be incorporated directly into the in-service training programme on several levels:

In order to execute the distance learning courses (level A of the concept), teachers must be able to describe and incorporate concrete teaching modules and/or syllabus areas from their own practice.

The participating teachers have defined the content of the study groups (level B of the concept). The collaborating teachers have defined the content of the inter-school collaborative projects (level C of the concept).

The teachers carry out individual and written evaluations of the activities in progress, on a running basis.

The development of the subject-specific content of the activities has taken place in a transnational collaboration between the educational establishments (universities, ministries and teacher training colleges), which have comprised the partners in the project.

The focus of the project has been reading and the development of early reading skills. Reading skills and their development make up a large part of the efforts being made to improve the level of general skills in European mainstream education. The results from the international reading survey (IEA) constitute the knowledge on which the project builds and therefore forms the basis of the developed concept.

Teaching Children to Read - A quality description of the outcome

The course is about teaching children to read. In the early 1990s an extensive survey - the IEA Study of Reading Literacy - was undertaken in 32 countries around the world.
By comparing information about cultures, school systems and the strategies employed for teaching reading, the survey provides a basis for considering effective teaching. This course is based on the findings of the Survey. The main aims of the Survey are explained in the following paragraph:

"Many diverse views exist about the best way to teach children to read, yet little is known about which countries are most successful in achieving this aim or what the most productive strategies are for doing so. Moreover the campaigns for turning around the rising tide of illiteracy in the world add a note of urgency in the efforts of literacy researchers and practitioners."
(Foreword to: Elley, Warwick B. The IEA Study of Reading Literacy: Achievement and Instruction in Thirty-Two School Systems)

The course offers the teacher the opportunity to learn about and to share ideas and experiences of teaching reading with teachers in other countries in Europe. The teacher will learn that some strategies and approaches have been found to be more effective than others and will have the opportunity to try them out in the teacher's own classroom.

By reflecting on the teacher's own practice and the experience of teachers in other areas, the course will allow him to consider new possibilities and to enrich and develop his teaching.

The authors of the course believe strongly that the number of children who have reading difficulties, and are labeled as having special educational needs, will be reduced if teachers in Europe can recognize and deploy teaching strategies for reading which are the best and most effective for their particular situation.

The course involves the use of new means - both technical and non-technical thereby improving flexibility of learning in relation to space, time and choice of contents or teaching materials (Open learning) and improving access from a distance to education systems (Distance learning).

This means that the entry requirements in order to follow this course, the teacher will need:

- To have access to a computer with connection to the Internet
- An e-mail address. The teacher may wish to use his own computer at home or he could use a computer in the school, or the teacher may wish to use both.
- To have some familiarity with 'browsing' the World Wide Web, and with sending and receiving e-mail messages
- To be prepared to give time to reading the course texts and to complete the associated tasks
- To find a colleague (or even better several colleagues) in the school or center with whom the teacher can share the course
- To be prepared to reflect upon his practice and to share his ideas and experiences with the colleagues and with other teachers in Europe
- To discuss his intention with his Head teacher and seek his or her approval.

The course consists of 6 modules; all 6 modules must be undertaken to complete the course. Each module consists of:

- A key text (about 10 pages in length) to read and then discuss with a colleague or colleagues in the teacher's own school or center
- Related texts and links to help the teacher develop his understanding of the main ideas in the module
- References to important materials on the Internet and in books
- A task, which includes actions the teacher, has to undertake. The tasks are designed to help the teacher to:
    - explore ideas relating to the topic of the module
    - reflect on his current practice
    - develop his teaching in the light of what he have read and reflected upon.

In carrying out the tasks the teacher will have the opportunity to share his experience with teachers elsewhere in Europe via facilities in the TESS Network®. It is an essential element of the course that the teacher should participate in discussions both with his own colleagues and with teachers elsewhere in Europe.

Changeability, flexibility, and priorities mark the new paradigm

Firstly, the application of information and communication technology into education is considered a major topic of development. The results of the project SocraTESS ODL Network demonstrates, among other things, that flexible in-service teacher education and virtual communities of practice can encourage the individual teachers to become learning citizens and to renew their teaching.

Until recently, the societies in Europe were organized according to the objectives of the industrial production, but the growing importance of knowledge, communication, and co-operation is leading to a world which is no longer static and predictable. European teachers therefore need to be very flexible, very skilled in accessing and using information, and capable of working collaboratively with others if they are to succeed.

Secondly, the current need for education, which is inclusive with respect to children with special education needs, is considered a major topic. The European community needs to develop a school where the frequency of dropout and segregation is drastically reduced and where the individual competence of pupils is increased.

In order to achieve this, it is necessary for teachers through their thinking and teaching practice to, on the one hand, orient themselves towards the criteria for openness and flexibility (mentioned above), and, on the other hand, to anticipate criteria relating to competence in the schools of the future. In order to foster the realization of the human potential, the teachers need to focus on the competences needed by the young generations to be able to study, work and thrive in the 21st century.

Thirdly, the reinforcement of literacy education is considered a major topic. This topic is closely linked to the second topic. Reading is the pave road to a rich life. Thus, every teacher should be knowledgeable with respect to the best ways to encourage and support the development of reading skills.

Open and distance learning

Described above is a pedagogical method, which to a large extent is built upon and incorporates the idea of information and communications technology. In this section special attention is focused on considerations which the application of open and distance learning in in-service training of teachers gives rise to and which are also expressed in the aims and objectives of the project.

By distance learning we mean asynchronous teaching, which combines elements from classroom teaching with flexibility in the special and temporal dimensions. This could be teaching using electronic mails, conferencing systems or other electronically mediated systems where several students are working within the same "electronic space".

Distance learning as a method strengthens and raises the quality of the content of collegial network groups. Likewise, earlier experiences show that the dynamic between theory, reflection and practice is strengthened.

Use of a computer and the Internet presents an invitation to learning processes of a more autonomous nature. And seen in this light the incorporation of these facilities can be instrumental in adding real substance to the pedagogical paradigm shift from teaching to learning. The first appearance of the computer was in the laboratory, and the laboratory is - in contrast to the auditorium - primarily based on individual problem solving or problem solving in electronic alliances. In the laboratory (learning) the basic intention is that of working autonomously at a pace and level, which suits the individual, while the auditorium (teaching) to a greater extent delivers the same product to everybody in the same time and place. The idea of this example is to show how perspectives on the nature of open and distance learning embraced by this project could be highly compatible with an individual learning style, based on pupil-to-pupil interaction and on a more problem- and task-oriented dialogue between pupil and teacher/tutor.

It is also this perspective, which under girds the process of transfer, by teachers, of the pedagogical methods of the project to their own practice (level C). The hypothesis of the project has been that achievement of the greatest possible effect will be obtained if in-service training of teachers is coupled with the daily pedagogical practice. If teachers are to see the utility value of a paradigm shift, then they must be capable of converting new knowledge into practice. Furthermore, the project builds on the idea of providing teachers with knowledge and experience about ways in which educational (special-needs) tasks can be solved in the classroom through the use of information and communications technology.

Technology

The project uses and exploits primarily the technological standards, which are already in existence. This means that by far the bulk of technical difficulties have been solved in the preparatory phase, so that the technical requirements for participating in the project are present at the start of the pilot project.

The most significant economic innovation in the project can be found in the fact that the collaborative activities of the project, ODL activities, the co-ordination and administration have been freed from physical buildings and are thereby independent of time and place. The experience and knowledge, which is developed in the project is free and accessible to everybody and can therefore create innovation at the local level.

And if you want to know more about this Socrates initiative please go to http://www.tess.dk

The writers:

Pia Guttorm Andersen (e-mail: pgt@tess.dk)
Pedagogical advisor in the field of special needs education and ICT

Ole Hansen (e-mail: oha@tess.dk)
Chief school psychologist.

PPR/TESS Network®
Svinget 2
DK - 8382 Hinnerup
http://www.tess.dk

References:

SocraTESS ODL Network: Final Report for the Commission, 1998
http://www.tess.dk/socraodl/report.doc
External Evaluation Report of the 1st project year, 1998
http://www.tess.dk/socraodl/ramsocod.htm

SocraTESS ODL Network: Final Report for the Commission, 1999
http://www.tess.dk/socraodl/ramsocod.htm
External Evaluation Report of the 2nd project year, 1999

EuroREAD - Teachers ability to adopt changes
http://www.tess.dk/euroread/euroread.htm

Factors regarding teachers ability to adopt changes
-paper for the European Commission on Guidelines, indicators and Innovative Steps towards an inclusive school.
Ole Hansen, et al. DG Education and Culture, December 1999

The Human Potential and its Realization
- An Evaluation of the EuroREAD Project
Bent B. Andresen, DK, January 2000

Is there a difference?: Contrasting experiences of face to face and online learning

MIREIA ASENSIO, VIVIEN HODGSON, KIRAN TREHAN
Department of Management Learning, The Management School, Lancaster University,
Business school, University of Central England.
m.asensio@lancaster.ac.uk
v.hodgson@lancaster.ac.uk
kiran.Trehan@uce.ac.uk

Summary

In this paper we examine the differences and similarities of the participants' experiences in working in face to face and online learning environments. The descriptions of experiences in collaborative assessment are particularly revealing, in that the emotional content associated with the process is shared by the participants of both environments. We point out a difference in the way the online participants communicated with each other and believed that they had become more interpersonally aware and more interpersonally effective. This leads us to consider to what extent the online environment can support the extension of interpersonal communication skills, as equally or in greater ways than face to face. The work on Derrida on the speech/writing dichotomy, has provided a framework of analysis to understand writing as an equal form of communication for the expressions of thoughts and feelings.

Background

The MA in Management Learning at Lancaster University is a two year part time programme for professionals in management education and development. In the main, participants are computer literate but unfamiliar with communications technology other than standard e-mail. All of the participants attend six residential workshops spaced throughout the two years and in between they work in tutorial groups or 'sets' usually comprising 5 students plus one tutor. The intended purpose for the sets is to provide support for each individual to choose, plan and write course assignments as well as to discuss matters of interest arising from either the programme itself or from people's work or career experience. The sets are also part of the assessment process of the programme, which is collaborative and involves peer, self and tutor assessment of each assignment.

Participants chose during each workshop whether to work in a set that will 'meet' face to face or 'online' in Lotus Notes. The face to face groups meet together for a part day once every 5/6 weeks, very often in the place of work of one of the set members. The online groups, on the other hand, meet on a continuous basis in both their 'set' conferences plus in a general group conference which is open to every one on the programme. In this paper we will explore the nature of the difference in experience between those participants that chose to work in face to face sets and/or in online sets.

Methodology

The basis of this research is phenomenographic and draws on individual interviews, focus groups and observations of both face to face and online environments. Marton explains phenomenography as a research approach for understanding people's ways of experiencing the world. He defined it as:

> The empirical study of the differing ways in which people experience, perceive, apprehend, understand, or conceptualise various phenomena in, and aspects of, the world around them. (Marton 1994: 4424)

The aim of phenomenography is thus to describe qualitatively different ways of experiencing phenomena, in this case the experience of working in the two learning environments (face to face and online). The phenomenographic emphasis on *variation* of experiences is particularly suited to this research, as we aim to examine the differences and similarities of participating in the two learning environments.

Methods

This study examines the experience of one particular cohort of 18 participants. The interviews ranged from half an hour to one hour in duration and began with a request for the participant to talk about their experience of working in each learning environment. It is a feature of phenomenography to follow the line the interviewee is taking and bring in questions that provoke spontaneous reflection by the respondent on their own experience. The focus groups involved two informal sessions with a mix of face to face and online participants. This technique was used in order to gain an in-depth understanding of the experience and emotional content associated with the process of collaborative assessment.

Richardson (1999) in a recent evaluation of phenomenography research in education, argues for more attention to be paid to accounts given by participants in real-life situations. We believe the use of observation in the natural setting provides a richer perspective on accounts of experience which complements the interview. We conducted random, non participant observations in both the face to face setting during workshops and set meetings, and in the online settings during online interaction.

Differences and similarities

This section describes what participants told us about their experiences of working in either or both learning environments. The issues raised by the participants were related to the choosing, planning, writing and assessing their assignments and their experience of these processes in their chosen learning environment. An illuminating way of looking at these descriptions is to note the words that participants used during the interviews. The table below already provides some hints on the contrasting experiences of working in a face to face and online learning set.

Face to face	Online
"laugh" "high energy" "chatting" "spontaneity" "enthusiasm" "immediacy" "social" "emotion"	"jokes" "chatting" "crystallisation of thought" "reflection" "exciting" " rich dialogue" "flexible" "fun" "emotion"

Table 1: Language used by the participants

The table also shows some striking similarities, particularly related to the emotions experienced in both environments, as we will examine and discuss in more detail later on in the paper.

The face to face experience

In the face to face environment it appears that participants valued the social dimension of seeing each other, of chatting, of laughing and the immediacy of communication. The following statement describes in vivid language this experience:

> "I think the advantages in face to face are not to me learning advantages, particularly, there are other social advantages…The immediacy of peoples' responses, people are obliged to give you a quick response, pick up on signals that people give out that helps you draw people's ideas more, tone of voice, peoples' ideas are bouncing at each other in that room. You can see peoples' faces… In face to face, there is a build of energy, fun conversations escalates and becomes enthusiastic and exciting, there is laugh and people' body languages, and I value all of this very highly" (Glenda)

Participants who had not experienced the online environment seemed, none the less, to be aware that they had less contact with their set members. They spoke of how they believed that in the online sets, there was more sharing of ideas, work progress seemed more continuous, structured and timely. Interestingly, though these participants seemed to acknowledge the perceived disadvantages of their chosen environment they did also feel positive about working face to face. They believed that having regular meetings gave them a sense of good discipline, a sense of doing OK in their work and particularly a sense of not being on their own. They also speculated that through the process of writing in the online environment, spontaneity of ideas was lost and that communication became more formalised and time consuming.

The online experience

Quite a few participants had the perception that, in contrast to face to face communication, the online environment was likely to be a cold and lonely environment. However, the descriptions of

BEST COPY AVAILABLE

experiences from the online participants seemed to indicate the opposite. These participants felt that there was a sense of caring, and that chatting and humour as well as the 'village hall' (the general conference used for chat and exchanges not related to the completion of assignments), were mechanism for building relationships with people. One face to face participant who had observed some online interactions pointed out the following:

> "There is also quite a strong social dimension to it. Specially in the early stages a lot of the discussion was nothing to do with work… It seems to be possible to have discussion about anything really in exactly the same way as you would in a face to face set" (Peter)

It is interesting to mention here Derridas' work on the writing/speech dichotomy and particularly the notion of 'presence'. Derrida, we believe, provide us with a framework to understand the reason why online communication is often perceived as a cold and lonely learning environment, and somehow an inferior way of communication as we discuss later on in the paper.

The online participants reported that discussions were more reflective, and the dialogue richer than in the face to face setting. They expressed feeling a sense of working progress and continuous contact and feedback from the members of the set. Probably one of the most significant aspects of participants' experience in both environments is related to the feelings generated during the collaborative assessment process. Collaborative forms of assessment occupy unusual education territory. In addition to challenging conventional cannons of academic assessment, such approaches offer the potential to generate insights into individual and group behaviour in a crucial area of educational practice. We would consequently like to explore and contrast the emotional experience involved in operating in both face to face and online collaborative assessment.

The emotional experience of collaborative assessment

One of the intended purposes in the programme is, amongst other things, to encourage and support participants to become more critically reflective about their own practice in the professional context. This partially involves the development/extension of the necessary 'skills' to be supportive to fellow learners, whilst at the same time developing their skills in critically evaluating their work and those of others. This challenging process also involves the ability to articulate, recognise and check both their own and each others' feelings and thoughts. Working in sets and particularly during the process of assessing, is then a key opportunity to develop these skills. The intention of this section is thus to explore and contrast the emotional dynamics involved in face to face and online assessment. For some students, engaging in collaborative assessment is often emotional, anxiety provoking and at times painful as the following extracts from both face to face and online participants highlight:

> **Face to face experience:**
>
> "There was a feeling of uncertainty. You feel a part of yourself is being exposed and being assessed, so there is a vulnerability" (Debbie)
>
> **Online experience:**
>
> "The whole experience was very emotive, I felt pretty distressed about it" (Helen)

Vince (1996) argues that any consideration of learning needs to take account of the emotions experienced by learners in the learning context. Thus an experiential course should by it very nature touch participants' emotions. Of the radical attempt to address learner-teacher power relations within experiential learning he says:

> Approaches to learning that break free of dependency on the teacher, and place emphasis on the responsibilities of the learner, always create anxiety. (Vince, 1996:121)

The above accounts show the dissonance experienced by some participants. In the sense that participants felt unsettled and experienced uncertainty and anxiety. However, what is interesting to observe is that with the online discussion, the participants ultimatel, viewed the learning provoked by their experiences very positively.

> "On reflection it allowed me to develop two things, … the ability to self assess subjectively, objectively and to think about the process… this sponsored interesting debates"(Alan)

Whilst the face to face illustration provide insights into continued uncertainty and fear.

> "My second experience was very difficult … we seemed to go back to square one. We only had a brief discussion about the assessment process during the meeting before we circulated our essays, we did not agree on the process or criteria. It was just disappointing" (Glenda)

The experience of emotions in relation to assessment, is strikingly similar in both learning environments. However, it appears that the online participants perceived the process of assessment as a positive learning outcome. This difference in perception lead us to explore whether the intrinsic characteristics of the online environment enabled participants to become more aware of the interpersonal skills needed, to deal particularly with the challenges and emotions experienced during the assessment process.

Is there a difference?

We found that the participants who had chosen the online option for most of the sets, gave more reflective accounts during the interviews on how they have evolved ways to communicate with each other. The depth of these accounts was greater than those from the accounts of those participants that had only ever chosen the face to face option. The online participants were more likely to articulate the ways they believed they had 'learnt' to check other participants feelings and thoughts, and the way they had 'learnt' to express their own feelings and thoughts in the online environment. In several cases they spoke of how they believed they had become more interpersonally aware and more interpersonally effective.

The following entry demonstrates how one participant checked meaning with other participant to avoid misunderstanding.

> "If I am not sure what someone means, what the emotion that goes with a particular message is then I ask them. I reply with a message that says, do you mean this or do you mean this? Can you tell me a little bit about how you are feeling about it? so as long as I remember to surface those issues and deal with them" (Alan)

And how they had learnt to identify other people's feelings.

> "I have found that when you are working with people for a period of time you start to read far more than the words on the page. You get to understand the tone, the whole message and that builds over time just as a face to face relationship" (Alan)

> "I think people are beginning to be able to read how I am feeling because of the way I structure my words, anecdotes and things that go with it" (Brian)

We need to take into account that generally the participants on this programme, because of their professional background, are very often already experienced and skilful practitioners in the art of interpersonal communication. It seemed clear that when working in the online environment, the participants were applying skills already learnt in their professional practice. There was also an indication that working in the online space encouraged participants to rethink their interpersonal practice in the writing of their assignments as well as in face to face interactions. As one participant said:

> "During the last set actually I did not set out to write a paper that conveyed emotions and nuances neatly, but ended up spending a lot of time making damn sure that my paper did convey the emotions and nuances I wanted to say as neatly as I could possible do it" (Terry)

It seemed to us that the online environment supported the 'extension' and 'transfer' of interpersonal skills in ways that the face to face environment did not. It appears that the intrinsic characteristics of the online environment (i.e. asynchronous and text based) allowed people to be aware of their own and other people's contributions and to reflect upon the process of expanding their interpersonal skills. In addition the perception that the online environment may be more open to misunderstandings –due to lack of non verbal cues– might have encouraged participants to be careful about the use and choice of words as well as about the tone and frequency of their messages. The different challenges experienced from working in the online space, seemed to positively encourage participants to rethink their interpersonal practice. It could be argued that the face to face groups were not as confronted with the 'difficulties' of the intrinsic characteristics of online communication, since the environment they chose to work in was more familiar and consequently less overtly challenging. It is our belief that as well as the asynchronous nature of the online environment, writing as opposed to speech, is potentially a significant issue in trying to understand this difference in experience.

Writing versus speech

One of the reasons given by participants for choosing the face to face setting was because of the perceived coolness, loneliness and difficulty to convey emotions in the online setting. There is somehow an explicit and implicit assumption that speech is a superior form of communication, particularly if looking at communication that involves feelings and emotions. However, as we have shown, the experience of the online participants not only differs with this assumption, but it also points out to ways of enhancing interpersonal skills. At this point the work of Derrida (1967) on the speech/writing opposition is particularly illuminating and relevant to our argument.

Derrida confronts the argument for the priority of speech over writing which he claims is existent in Western thinking. He argues that through three millennia of Western philosophy from Plato and Aristotle to Rousseau, Hegel, Husserl and others, philosophers have emphasised speech as the privileged medium of meaning. Speech is superior to writing because it is seen as being closer to thought; whereas writing is seen as a weak extension of speech and a pernicious threat to the true carrier of meaning. Derrida claims that the notion of 'presence' underpins central assumptions of Western philosophy such as the meaning of 'being', 'truth' and 'reality'. Presence can be spatial (same place) and temporal (same time). In speech the speaker and the listener have to be present in space and time, however writing operates on absences and it is mediated. Derrida argues that the 'essence' of writing is the ability to order and articulate our perceptions and comprehension of the world, and not merely the script form of language. Thus, according to Derrida, writing is then not less natural and authentic than speech, writing does not follow speech but instead writing and speech are continuous and evolving processes. Derrida's theory of writing 'deconstructs' established canons and it encourages us to rethink the privilege of speech over online communication.

Conclusion

In this study we identified that collaborative assessment is a highly emotional process which is experienced by participants in both learning environments. However participants of the online environment appeared to become more interpersonally aware and more interpersonally effective in the ways they communicate with each other, in particular in relation to the expression of emotions. It is our view that the enhancement of these skills is partially provoked by being involved in the process of assessment and by working in the online environment. Derrida's work challenges the writing/speech opposition and brings in a radical way of understanding online communication. If we see writing as close to feelings and thoughts as we see speech, we can also speculate that the online environment –in perhaps a greater way than face to face– not only provides a milieu for the extension of interpersonal skills, but also provides a bridge to transfer these skills to other contexts of the professionals lives of the participants.

Acknowledgements

Some of the research on which this paper is based was part-funded by a grant from CALT (Committee on Awareness, Liaison and Training) of JISC (Joint information Systems Committee) Higher Education funding council, UK. The views expressed here are not necessarily those of CALT or JISC. We would like to thank to all the members of the part time MA in Management Learning at Lancaster University who participated in this research.

Bibliography

Derrida, J (1967) De la Grammatologie, Paris, Minuit. Translated by Chakravorty Spivak, G (1976) Of Grammatology. The Johns Hopkins University Press

Marton, F. (1994). Phenomenography. In T.Husen and Postlethwaite, T.N., The International Encyclopedia of Education 2nd Edition. Oxford: Pergamon, pp. 4424 - 4429

Richardson, J.E.T. (1999), The Concepts and Methods of Phenomenographic Research. *Review of Educational Research.* Vol 69, No1, pp 53 - 82.

Vince, R. (1996) "Experiential Management Education as the Practice of Change" in French, R. & Grey, C (Eds) Rethinking Management Education. London, Sage.

POSTER PRESENTATION

Choosing NVivo to support phenomenographic research in networked learning

MIREIA ASENSIO
CSALT, Department of Management Learning, Lancaster University
m.asensio@lancaster.ac.uk

This poster will describe the rationale for choosing QSR NUD*IST Vivo (NVivo) as a software package to support the management and analysis of data generated from the JISC/CALT-funded 'Networked Learning in Higher Education' project at CSALT, Lancaster University. This project aims primarily at understanding the student's experiences of participating in a networked learning course. The basis of this research is phenomenographic and draws on individual interviews and observations. It is complemented by a survey based study of students' approaches to learning in networked learning environments. The rationale for choosing NVivo was thus aligned to the aims of the project, the characteristics of phenomenography and the type of data that the research is generating. Our experience of NVivo is still at a formative stage and with this poster we hope to initiate a dialogue among researchers, on the implications and experiences of using this type of software to support research in networked learning.

THE COSTS OF NETWORKED LEARNING - AN INTERACTIVE WORKSHOP

Charlotte Ash, Sheffield Hallam University, Professor Paul Bacsich, Sheffield Hallam University

---

Abstract

This workshop will be based heavily on the ongoing Costs of Networked Learning work undertaken by Sheffield Hallam University. Phase one of the study, which ran from January to June 1999, proposed a planning document and financial schema that together would accurately record the costs of networked learning. During phase one a number of issues were raised both by the study team and by other stakeholders. These issues need to be resolved during phase two of the project, starting later this spring, so that the framework offers the most acceptable solution to its potential users.

Introduction

Despite a long tradition of costing open and distance education, costing is a subject that most educationalists - researchers, academics, and evaluators but not usually managers - shy away from. But in today's competitive and changing environment, knowledge about the cost-effectiveness of a particular course is an 'edge on the rest of the market'. Establishing a universal but realistic costings framework is the first small step towards knowing the cost-effectiveness of each course offered.

The "Costs of Networked Learning" project - started in early 1999 in answer to a call for proposals by the Joint Information Systems Committee (JISC). The project aimed to uncover the hidden costs of networked learning and to develop a schema for recording all costs. The study team found that there were two types of hidden costs: those which were fundamentally unrecorded (such as academic staff overtime) and those more generally absorbed into larger budgets (therefore unable to be attributed to an individual activity or even genre of activity). After the publication of the project report in October 1999 the study team were asked to propose phase two of the study. This phase takes the theoretical framework proposed in phase one and develops it into a practical handbook. The project starts in May 2000 and runs for a further six months. Part of phase two is to resolve a number of contentious issues, such as the recording of academic staff time - an essential part of Activity-Based Costing, but an acknowledged anathema to academics. These issues are outlined in full below. We aim to discuss a number of these during the workshop in order to foster debate and begin the process of consultation - we hope to be able to find solutions based on the input of the people who will be using this costings framework.

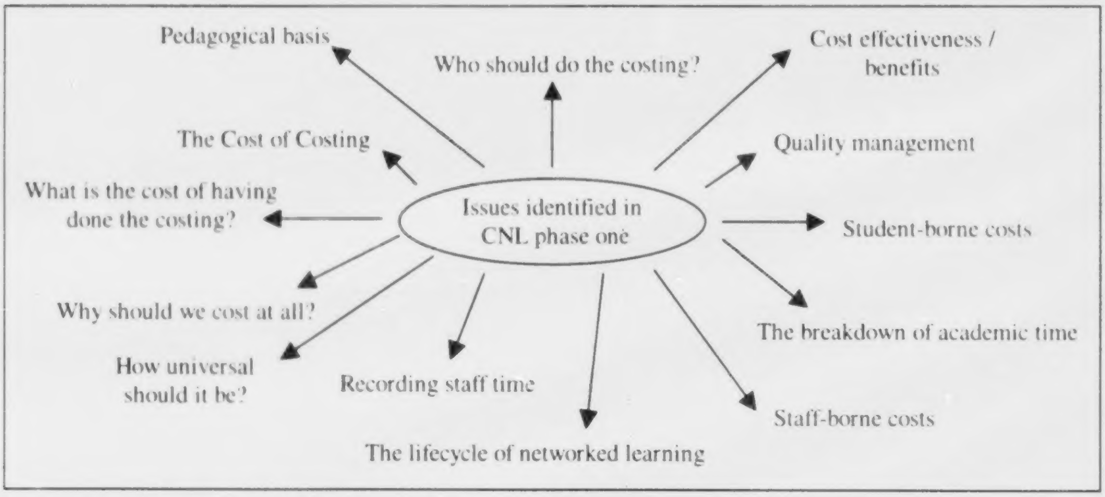

Issues identified in CNL phase one
Pedagogical basis
Who should do the costing?
Cost effectiveness / benefits
The Cost of Costing
Quality management
What is the cost of having done the costing?
Student-borne costs
Why should we cost at all?
The breakdown of academic time
How universal should it be?
Recording staff time
Staff-borne costs
The lifecycle of networked learning

diagram one - a spider diagram of the issues identified in phase one of the CNL project

Presentation of Key Issues

1. Why should we cost at all?

The average person could be wondering where the sudden interest in costing has sprung from. On the one hand the Funding Council wants us to record, in a transparent manner, how we spend our research grants; and on the other we are being asked how much it costs to run our courses. This interest in costing is not a recent obsession, indeed costing has been going on quietly for a great number of years, especially by providers of distance education. Its sudden breakthrough to the more conventional education system has been brought about by competition. Higher Education is no longer solely the remit of universities, courses are being offered by virtual universities, the non-educational sector (corporate universities) and institutions abroad. In order to continue to be a supplier of higher education each institution is going to need to streamline its operations to reach a greater, and more diverse, body of students with high quality education whilst remaining within budget. The ability to do this is dependent on the assimilation of accurate and timely costings information.

Discussion point: Should UK Higher Education be concerned about this competitive environment? What needs to be done not only to survive, but to come out on top of the rest?

2. Who should do the costing?

Once we have decided that, regardless of whether we want to cost or not, it has to be done, which poor soul is going to do it? Some might suggest this should be the role of the finance department, or that everyone should play their part and someone uninvolved should compute the final figures. Obviously everyone will have to play their part if Activity-Based Costing is adopted but whoever holds these parts together will need to be a highly skilled and dextrous individual. Not only will they need to have their personal 'Babel fish' working at all times but they will also need the patience and understanding of a trained negotiator. They will need to remain independent, so as not to bias the figures, but involved enough to understand what they mean.

Discussion point: Should there be one central person, or team of people, who gathers the figures from the Activity-Based Costing? Should Activity-Based Costing replace current costing practices and therefore be the remit of the Finance Department?

3. What is the Cost of Costing?

One of the growing concerns about these costing exercises is how much undertaking them is going to cost. We could say that the institution undertakes costing in some form already, and that Activity-Based Costing is an extension of, or better still a replacement to, that existing system. Luckily some institutions are coming up to the time when they would naturally replace their existing systems but others have just invested heavily in new software. In addition, someone is going to have to pay for the retraining of Finance Directors and their staff. And then there is the issue of non-financial disturbances, such as those that any serious change will bring about.

Discussion point: Who should pay for this change in accounting regime? Should individual institutions be expected to fund the change on a year-by-year basis? Or should the Funding Council offer extra funding to facilitate the change? Should the move to Activity-Based Costing be compulsory or at the discretion of the individual institution?

4. What is the cost of having done the costing?

The cost of having done the costing is a serious issue - once we have reallocated the hidden or unrecorded costs to the correct budgets and decided what to do with personally incurred costs, how are we going to pay the bills? The direct cost of providing education might go down, but the cost of keeping the cafeteria open may increase to the extent where serious thought has to be given to the viability of its existence. Perhaps the cost of everything will go up, or down. How will these changes be dealt with and by whom? One thing is certain, more accurate costing information will highlight successful and struggling academic programmes; but hopefully the decisions whether to continue with them will be based on more than just financial concerns.

Discussion point: Is the cost of having done the costing a reasonable argument against costing? How do we deal with the anticipated fluctuation in the cost of university services and educational provision? Who makes the decision about what stays and what goes? And what information should that decision be based on?

5. *Cost effectiveness / benefits*

Despite a growing body of work about costing networked learning, the debate about the presumed efficiency, effectiveness and additional benefits, or not as the case may be, of such activities is rife. Without concrete evidence either way costing is going to remain a cold and non-academic subject. There is a genuine need to develop a methodology to measure effectiveness. As a recent report states "while the debate [about effectiveness] will continue, it is too late to turn back. Recent history suggests that both the variety of offerings and the number of individuals availing themselves of these alternative forms of learning will not only increase but will increase dramatically. The alternatives are entering - and in some circumstances, becoming - the mainstream" (NCHEMS, unpublished). In addition, institutions are concerned that there is not an accepted uniform methodology to explain how a move towards networked learning could benefit institutions in both the long and short term.

Discussion point: How important is this issue to different stakeholders - academics, managers, students? How can we prove substantially one way or the other whether networked learning is as good, if not better than, conventional teaching? Should the existence of courses be decided on effectiveness or cost alone, or should there be a joint methodology? How do we ensure that the results are conclusive and universally accepted?

6. *Pedagogical Basis*

Our research shows that one barrier stopping institutions moving towards networked learning is a lack of pedagogical evidence to support such a move. Is the quality of education better or is the time to study shorter when using networked learning than when not, and how can this be measured? Indeed should we be concerned with this issue at all or is the evidence in existence already?

Discussion point: What are the pedagogical reasons for moving towards networked learning, either as a support or complete delivery tool? How can these be quantified? And how useful are the findings going to be?

7. *Staff-borne costs*

The recognition of personally-incurred costs, by staff and students, was a major breakthrough for the "Costs of Networked Learning" study. A large majority of hidden and unrecorded costs are absorbed by staff and students (students are covered separately below). What about the expenses we incur whilst away from home on business that are not reimbursed by the institution including entertaining potential research partners, evenings out and sight-seeing whilst in a foreign country, calls home to wish the kids good-night - expenses that we would not have incurred had we not been away on business? How many of us own a home PC and use it for work purposes, be it fairly infrequently or every weekend, or what about our time, working outside of the average 9-5.30 day - is an extra hour or two, especially when up against a deadline, reasonable; what if it coincides with your partner's birthday; or extends to two or three hours every day and whole days on the weekend, just to keep up with the flow of work?

Discussion point: Is this an issue that needs addressing or will academic staff continue to put in sometimes up to sixty hours a week just for the love of the job? If we do address this issue will we end up without jobs because covering staff-incurred costs will bankrupt institutions? What about a half-way measure - institutions to cover overtime, but staff to pay for their own PCs and glasses of wine bought for work purposes, but where some choice has, supposedly, been exercised?

8. Division of academic time

When contemplating the move to Activity-Based Costing a number of issues arise about what activities the institution is involved in, and within that what activities academic staff are involved in. The 1997 KPMG / Joint Funding Councils report stated that academic time broke down into categories of teaching (undergraduate and postgraduate levels), research (grants, contracts and general research), other service activities (short courses and consultancy work), department administration (for some reason including services to professional bodies), and faculty and university administration. Three years on with the introduction of technology on a wide-scale basis are the boundaries so clear or do we need a new, more sophisticated breakdown?

Discussion point: How does your working day break down? How does this compare with that of your colleagues? What would you propose as a sectoral norm? When, and what, are the exceptions?

9. Recording of academic time

Time-sheets have generally been regarded as anathema to academic staff. But if Activity-Based Costing is adopted some form of time recording mechanism is to be expected. Time-sheets are the usual method for collecting this data, and however hated they are regularly used by a great number of people working on European-funded projects - but are they really an accurate measure of time spent on activities? The aforementioned KPMG / Joint Funding Council report suggested four methods: use information from the department's workload planning systems; ask programme managers to estimate staff time spent on each activity; conduct a survey of academic staff to estimate the proportion of time they spend on each activity; conduct a diary or time-sheet exercise, as a one-off or ongoing project. The more recent JCPSG report (1999) had similar ideas; it states that methods of allocating staff time can be split roughly into the following approaches: estimation; proxies; structured interviews and workshops; annual retrospective time allocation in percentages; in-year retrospective time allocations (about 3-6 times per annum); and sampling that meets statistical levels of precision (ie diaries).

Discussion point: What do you feel would be the most successful method of recording the time spent on activities by staff, in terms of acceptance and accuracy? What is your experience of recording time in the past? How are we going to break the negative feeling that surrounds this activity?

10. Division of the Course Lifecycle

The "Costs of Networked Learning" project team realised that in order for the costing methodology to resonate with academic staff the framework needed to revolve, at least in part, around the core activity of teaching. After a number of false starts, and a great deal of testing, a model with three phases was proposed. Cyclically it revolves around the phases of planning and development, production and delivery, and maintenance and evaluation. The model encompasses students, staff and the institution as the main stakeholders, and expects that activities such as strategic planning and facilities management take place outside what is primarily a course lifecycle model.

Discussion point: How well does this model resonate with your view of the course lifecycle? Is it simple enough to promote usage or in its simplicity does it overlook the main areas of importance? What changes need to be made to make this course lifecycle model comprehensive and acceptable to those who will use it?

11. Student borne costs

Students have been bearing part of the cost of education for years, just like staff have been marking assignments on the dining room table. We believe these costs are rising as we progress into more networked learning, both supported and whole courses. However, students are driving for networked learning: our research shows that although students believe that networked learning is increasing the cost of their education, they also believe that this is offset by a general view that it is also enhancing their experiences, making learning more enjoyable and profitable.

Discussion point: How do you feel about passing the cost of printing handouts, word-processing and printing assignments onto students? Is there are limit to how much students should have to contribute? Should they be told in advance of the expected financial contribution to their education? What effect will this transference of cost have on the participation in higher education of disadvantaged students?

12. Quality Management

During our research, concerns about the quality of networked learning materials and a lack of standards against which quality could be measured were said to be two issues restricting the introduction of networked learning. In addition, institutions also felt that networked learning, and similar initiatives, were uncharted territory; institutions are unsure about the structure and status of such activities.

Discussion point: How can this problem be addressed? Are the emerging IMS standards going to be sufficient or is a more comprehensive and specific set of standards needed? What about an evaluative framework to access the value of materials? And how can we reassure institutions about the structure and status of these activities?

13. Universality

Collaboration between internal faculties and departments, different institutions, and on a multinational basis, is becoming increasingly common for teaching as well as research. At present in any such collaboration each partner is likely to have different management, planning and financial accounting approaches, leading to difficulties in collaboration. Thus there is a great need for a uniform planning and costing methodology so that such collaborations can thrive and that organisations can negotiate with each other using a common vocabulary. Only in that way can misunderstandings be avoided. In summary, a universal approach is needed in all multi-institution, multi-faculty, and multi-national research and teaching ventures.

Discussion point: How universal should the methodology be? Should each institution adopt its own spin on an accepted methodology? Should our international partners be expected to provide the same level of information for joint activities? Will there be sector-wide analysis of the costing information provided or should it be for internal purposes only, except when jointly agreed upon by those involved?

Conclusions

During this workshop a number of the above points will be discussed, with the aim of gathering your opinions and thoughts. You will have the opportunity to influence the outcome of the "Costs of Networked Learning" phase two. These issues will also be discussed at length at other events and on the project listserv accessible at http://www.mailbase.ac.uk/lists/costs-of-networked-learning/ where your input will be most valuable. We look forward to welcoming you to our interactive workshop.

References

1. Bacsich P Ash C Boniwell K Kaplan L Mardell J and Caven-Atack A (1999) *The Costs of Networked Learning - Final Report*. Sheffield. Sheffield Hallam University.

2. KPMG Management Consulting and Joint Funding Councils (1997) *Management Information for Decision Making: Costing Guidelines for Higher Education Institutions*, Bristol, HEFCE.

3. Joint Costing and Pricing Steering Group (1999) *Transparent Approach to Costing: Mannual of guideance and implementation*, Bristol, HEFCE.

Authors

Charlotte Ash
Sheffield Hallam University, School of Computing and Management Sciences
Howard Street, Sheffield, S1 1WB, UK
Email - c.e.ash@shu.ac.uk

Professor Paul Bacsich
Head of the Virtual Campus Programme
Sheffield Hallam University, School of Computing and Management Sciences
Howard Street, Sheffield, S1 1WB, UK
Email - p.bacsich@shu.ac.uk

POSTER PRESENTATION

Building a Distributed, Asynchronous Learning Environment

Colin Baldwin, Teaching and Learning Support Unit,
George Edwards Library, University of Surrey, Guildford, Surrey, GU2 5XH

Abstract

The UniCafé project was established by a partnership between the University of Surrey (primarily the School of Educational Studies and the School of Management Studies for the Service Sector), four Further Education colleges, a Telecottage, the local library service and Tesco plc. The project aims to provide open, supported learning at a variety of traditional and non-traditional locations through electronic delivery.

The courses available aim to enhance personal and management development in particular for employees or potential employees in the retail and distributive trades.

In designing and implementing the technology, the different (and evolving) needs of the various stakeholders in the project had to be taken into account. The final solution therefore addresses the requirements of:

Academic Course Providers
e.g. Two alternative technological approaches desired for delivery support of course material.

Delivery Partners (the UniCafé sites)
e.g. Little or preferably no specific maintenance required for UniCafé machines.

Technical Staff
e.g. Seamless integration of technologies to simplify administration.

Students
e.g. Simple user interface with one password access to all course material.

This poster presents a case study of the UniCafé experience and is primarily concerned with the technical solution adopted to support all the needs of the UniCafé project. The chosen infrastructure, based upon a Lotus Domino server, provides open access to promotional material and taster courses and security for a choice of two different methods of course delivery – including one-to-many and one-to-one communication.

An Investigation and Design of Networked Learning in Inner-City Leeds

Tim Barker and **Rachel Pilkington**
Computer Based Learning Unit
University of Leeds
Leeds, LS2 9JT, U.K.

Email : {tim, rachel}@cbl.leeds.ac.uk

Abstract

A pedagogical framework for the implementation of a World Wide Web based course at an inner city Leeds school is described together with a detailed study of students own summarisation of course notes contained therein. Results of this study lead to some recommendations, principally that an artificial Learning Companion would help with the summarisation *process*, a feature which is lacking with the present support tool. Finally, an overview of a preliminary design for such a Learning Companion is presented as future work.

Introduction

Chapeltown and Harehills Assisted Learning Computer School (CHALCS) is an inner city Leeds school providing tuition and a supporting environment for pupils out of their normal school hours (Barker, 1998). The Computer Based Learning Unit at the University of Leeds has a long-standing research relationship with CHALCS and has in the past provided help in Science topics (Mohammed, 1996) and in evaluating CHALCS' effectiveness (Ravenscroft & Hartley, 1998). The work reported here is based upon the development of a novel Physics course in Astronomy and Optics utilising WebCT, a commercially available Virtual Learning Environment (Barker, 1999). This work aims to introduce Information Communications Technologies (ICT) to the CHALCS context together with an appropriate pedagogical framework then evaluate the utility of the approach.

This paper begins with an introduction to the pedagogical framework adopted for this work. An investigation which aims to highlight the difficulties students have with one key area of ICT use, i.e. creating their own notes, is then described together with the results analyses. The following section outlines the recommendations resulting from this investigation then finally conclusions are reached about the work so far and possible directions for future work are proposed.

Pedagogy of Networked Learning

A three-phase pedagogical model has been iteratively developed for the introduction of ICT-based learning at CHALCS. It consists of Acquisition, Argumentation and Application (Barker 1999). **Acquisition** is concerned with obtaining knowledge from the course material and can be likened to the processes of *accommodation* and *assimilation* (Ausubel, 1985). The next stage, **Argumentation**, is concerned with reinforcing internalised knowledge by seeking evidence, comparing or (self) explaining and is best carried out in a challenging social context. At a scientific level argumentation would involve the formal process of *deduction* (Johnson-Laird, 1988) particularly relevant in Physical experimentation. Taking a broader view, argumentation can be taught in terms of linguistic techniques, by exploring the connection between narrative and argumentative composition in both speaking and writing, examining planning strategies and providing argumentative resources (Andrews, 1995).

Finally, **Application** emphasises skills, of both quantitative and qualitative problem-solving (Ploetzner, 1998) in an attempt to further reinforce student's newly acquired skills and knowledge. Furthermore, collaborative problem-solving (Teasley 1993) exposes students to alternative viewpoints and corresponding explanations thereby challenging their own ideas and forcing them to adopt new problem-solving protocols.

These three pedagogical stages were considered in terms of the facilities provided by WebCT resulting in a suite of tools with an associated function for each of the stages. It was then possible to design tasks based on the available tools (plus Microsoft Word and face-to-face sessions) for each stage of the initial pilot work. **Table 1** illustrates this for a lesson on "Reflection and Refraction".

Stage	Tool	Function	Task
Acquisition	Compile & Word	Annotating own notes	Start to compile the Physics course notes then cut and paste them into word, adding your own thoughts as you see fit. These are your own notes. Complete this as homework.
Argumentation	Bulletin Board	Group based explanations & judgements	Discuss solutions to the following two problems using the bulletin board : a)... b) Ideally, how thick and how smooth should a glass window in a house be ?
Application	Whiteboard & chat	Group based model answer	Use the whiteboard and chat to solve the following problem as a group: "A person stands at the end of a swimming pool 8 metres in length .. What is the depth of the pool ? . "

Table 1. Mapping Lesson Tasks onto the Pedagogical Framework.

Although it appears from this overview that the three stages naturally progress linearly in practice this does not have to be the case. For example, it may be that students in the argumentation stage uncover deficiencies in their knowledge which requires backtracking to the acquisition stage.

An Investigation of Student's Summarisation Skills

Introduction

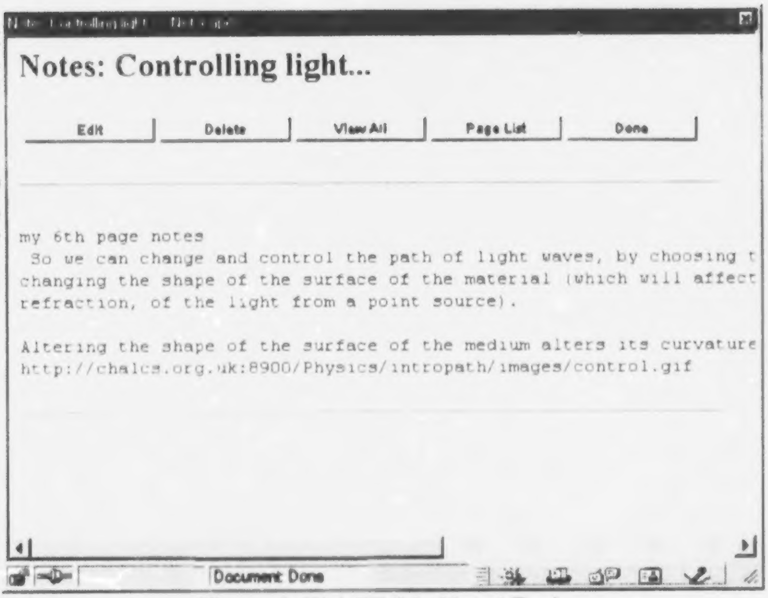
As shown above we are following a pedagogic framework based upon the literature and our evolving experiences in the field. These, together with the prescribed needs of the collaborating partner, i.e. CHALCS, led to the Research Aims (Barker, 2000).

Pilot work carried out at CHALCS led to the conclusion that WebCT required additional functionality in the form of an artificial Learning Companion to aid summarisation so a small study was designed.

Rationale.

From the Pilot work mentioned above it was found that the current WebCT 'my-notes' facility as shown in **Figure 1** does nothing to support the *process* of summary construction (Barker, 2000). The facility also contains only basic editing and no word processing capabilities. Furthermore, URL's are not active so that links, for example to glossary definitions, appear as a meaningless URL. Summaries are seen as essential in the Acquisition stage of the pedagogical model as they not only highlight key points of the course notes but also involve students in an active constructive process. Summarisation is in fact a Key Skill in the 'Communication' Unit, Level 2. (Qualifications and Curriculum Authority, 1999).

BEST COPY AVAILABLE



Notes: Controlling light...

my 6th page notes
So we can change and control the path of light waves, by choosing t
changing the shape of the surface of the material (which will affect
refraction, of the light from a point source).

Altering the shape of the surface of the medium alters its curvature
http://chalcs.org.uk:8900/Physics/intropath/images/control.gif

Figure 1. WebCT 'My Notes' Tool.

Therefore the aim of the study detailed below was to *identify student's needs in terms of ICT support when creating their own summary.*

Design.

Two subjects (females, age 17) were asked to collaborate in performing a summarisation task of a portion of the WebCT 'Lenses' module within the Astronomy and Optics course. They both study A Level Physics at the same school and have been attending CHALCS for a number of years. In answers to a question about "searching for the right information or taking the right sort of notes" S2 reported "I would benefit from note taking and note making to make appropriate notes" and S1 reported "I always get confused. I often have to do things several times because I don't have the right notes."

After a short demonstration, both subjects were asked to cut and paste from the WebCT notes into Microsoft Word then swap documents and comment on each other's work finally emailing their summaries to the Instructor. Artefacts collected for the purpose of analysis include video/audio tapes (later transcribed), Word 'summary' documents including the collaborators annotations (later annotated by the instructor) and WebCT data (e.g. page tracking logs).

Procedure

The video camera and microphone were first set up in the room pointing at S1's computer screen, having already secured her permission. Aside from being aware of the video data, the subjects were also aware that the WebCT on-line data was also being gathered.

We began by demonstrating how to have two windows open, one containing WebCT, the other containing MS Word then how to cut and paste text from the former to the latter. The 'compile' tool within WebCT was also demonstrated. Next it was necessary to demonstrate how to copy images from WebCT to Word. Subsequently, we demonstrated the use of Word's annotation facility by inserting a comment in an example document.

At this point we held a discussion with the students concerning their thoughts on effective summarisation techniques. The teaching style employed here and in subsequent

BEST COPY AVAILABLE

sessions was for the tutor to facilitate rather than dominate the discussion by eliciting students knowledge then encouraging them to expand their notions collaboratively.

The students were asked to summarise section 1 "Introduction to Lenses" which comprises of 6 sub-sections including a summary. They were reminded of the navigation facilities within WebCT then proceeded to cut and paste from WebCT to Word. In addition to capturing video and audio data classroom based observations were also recorded.

Towards the end of the summarisation session the subjects were warned that they would have to soon end then after 43 minutes they were told to stop summarising. At this point the summary documents were saved and swapped. The subjects were then asked to comment on each other's work by adding annotations. First though the tutor intervened to initiate a discussion of subject's impressions of their own and their collaborators summary document including eliciting strategies and decisions. The annotation activity was given just 11 minutes.

Following the annotation phase the tutor initiated another discussion concerning the differences between the two subject's documents leading to a discussion of summarisation method.

Results Analysis

Analysis

Both subjects responded well to the initial 'training' session with just the annotation demonstration requiring repetition. At this point they were quite proficient in WebCT, Windows and Word and cutting and pasting between the two packages presented no real problems. However, it did later become apparent that pasting WebCT hyperlinks into the Word document was ineffective as this resulted in an error and ultimately missing words ,e.g. "Outer rays have a larger angle of incidence and hence a greater **Error! Bookmark not defined.**". This lead to confusion as picked up by S2's annotation : "the error has replaced many important words and therefore nearly all of the text doesn't make sense". It is worth pointing out that S2 avoided this possible error by making less use of cut and paste and actually typing her own notes or even writing and drawing diagrams on a separate piece of paper.

The initial tutor-led discussion elicited the subjects preconceived notions of the content and process required to produce a good summary. These included :

- *Shorter than the original text:* "Like a shortened version of what you've picked up from what you've..." (S1)
- *Recap of main points:* "it's easier to get information from if its like...if you recap the bits you need." (S2)
- *Need to decide what to keep* : "You keep what you thinks important and relevant..." (S2), S1 saying "that's the hardest bit actually"
- In Physics *equations, diagrams and definitions are important*
- Sometimes *diagrams are clearer than written descriptions* : "...some things, they're not obvious if you write out, like, a description you need to draw the diagram to show what you mean... (S2)
- Use *note form*, in particular "trigger points" (S2)

It was observed during the actual summarisation phase that both subjects read the course notes first before commencing construction of the summary. However, S1 employed traditional sequential reading techniques reminiscent of static texts whereas S2 employed techniques which take advantage of hypertext structure. Subsequent page tracking indicated that during the actual summary construction both subjects navigated the course notes in exactly the same sequence, i.e. the pre-defined path.

A similar number of page hits were registered by WebCT in the study for both subjects (S1=32, S2=38). It is clear from the WebCT Hits Distribution, however, that S2 made greater use of the glossary facility whilst negotiating the summary process (see **Figure 2**). In addition S2 also read an article on the Bulletin Board.

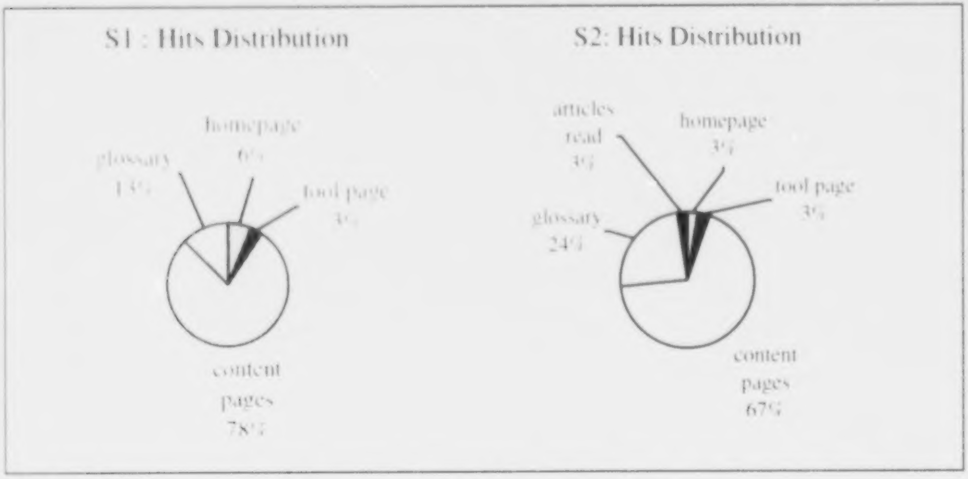


Figure 2. Comparison of Hits Distribution During Pilot

From the video it was noted that S1 employed a 'paste and complete' technique, that is sections of text are cut from the WebCT course notes, pasted then formed into complete sentences by typing. This technique was used extensively together with a separate 'editing' technique which was used more as completion approached. Upon a first draft S1 viewed the whole document, particularly looking at overall layout. As mentioned, the glossary hyperlinks did not work when copied and pasted into Word leaving error messages in the summary document. This resulted in S1 having to go through the entire document at the end and replace the errors with the actual word. Images were cut and pasted effortlessly to great effect. The Expert commented that both summaries were "very good" and that S1's was similar to their own.

Upon completion of the summary documents the ensuing tutor-led dialog revealed that S1 not only selected and edited on a sentence level but also maintained a contextual consistency between sentences by moving them around : "I've rearranged the sentences a bit because like you know like you read things in a different order". On the other hand S2 maintained the original sequence of notes : "I kept to the order it was in…". Interestingly S1 also stated that she added definitions from the glossary next to the appropriate diagram then consequently edited the text : "I've rearranged the writing to go with them". As already mentioned, S2 did not use cut and paste to copy glossary definitions but actually wrote them by hand then incorporated them into her summary.

S2 only made four comments on S1's summary commenting on S1's brevity ("This is quite good as it's very brief") and the hyperlink error already mentioned. S1 made nine comments on S2's summary, making quite detailed criticisms of her document. In particular she is concerned with S2's repetition ("this is the third time you've said this"), straight copying of text without explanation ("just straight copied out, no own notes made") and the general contextual consistency of the document ("this sentence has just been stuck in the middle of nowhere").

BEST COPY AVAILABLE

After completing annotating each other's documents the tutor-led dialog revealed that S2 had in fact repeated some information in her summary as pointed out by S1. It later became apparent that this was due to S2 thinking that this was just a first draft and would be subsequently refined, a method which she employs in her normal note-taking : "I didn't actually…edit that document". At the other end of the scale S1 relates "I just read it off, I never make notes" and is keen to point out the fact that she utilises "trigger points" forcing S2 to concede that "I don't pick up stuff that quickly".

Results

The need for S2 to have to write and draw on supplementary pieces of paper is indicative of the inadequacies of the cutting and pasting methodology and subsequently would be an ideal area for further support, for example a '*scratch pad*' for jotting down sections of notes. Editing of the pasted text is obviously an important part of summary writing, the subjects taking care to add appropriate words to form complete sentences and indeed carefully selecting the text in the first instance although less rigorously in S2's case. Further support could serve to scaffold this process in three stages :

1. in the initial selection **decision-making** (e.g. aiding selection of pertinent information)
2. during the **transfer** from one document to another (e.g. a *database* of equations, diagrams and definitions)
3. the subsequent **reflective review** process (e.g. employing notions of syntactic and semantic correctness both at the level of sentences and complete documents, especially checking cohesion)

This support would have to be **flexible** enough to allow subjects to utilise differing strategies in navigating the source material as evidenced above and shown in **Figure 3**. As shown S1 reads the course note sequentially whereas S2 utilised hypertext navigation more fully. Also shown is S2's use of the 'scratch-pad' and their tendency to produce a first draft then edit this. This is in contrast to S1's method of one draft only. Apart from the two extremes of summarisation techniques espoused by the subjects an interesting emergent factor of the dialogues is the dominating personality of S1 and almost submissive concessions of S2. Also, in terms of personality traits colloquialisms such as "like", "gonna", "sort of thing", "'cause" and "yeah" are much in evidence in the dialogues. Incorporation of these personifications in a summary support may prove advantageous (Lester, 1997) but require formative evaluation.

Conclusions

Further support is undoubtedly much needed to aid students when taking their own notes within WebCT due to the inadequacies of the 'my-notes' facility. From the study it has emerged that this support should include the following:

1. A scratch-pad for jotting ideas and diagrams.
2. A decision-aid to selecting pertinent text.
3. A database of equations, diagrams and definitions.
4. A cohesion aid.
5. A flexible underlying process model.
6. Appropriate personifications e.g. colloquial dialogue (Barker, 1999)

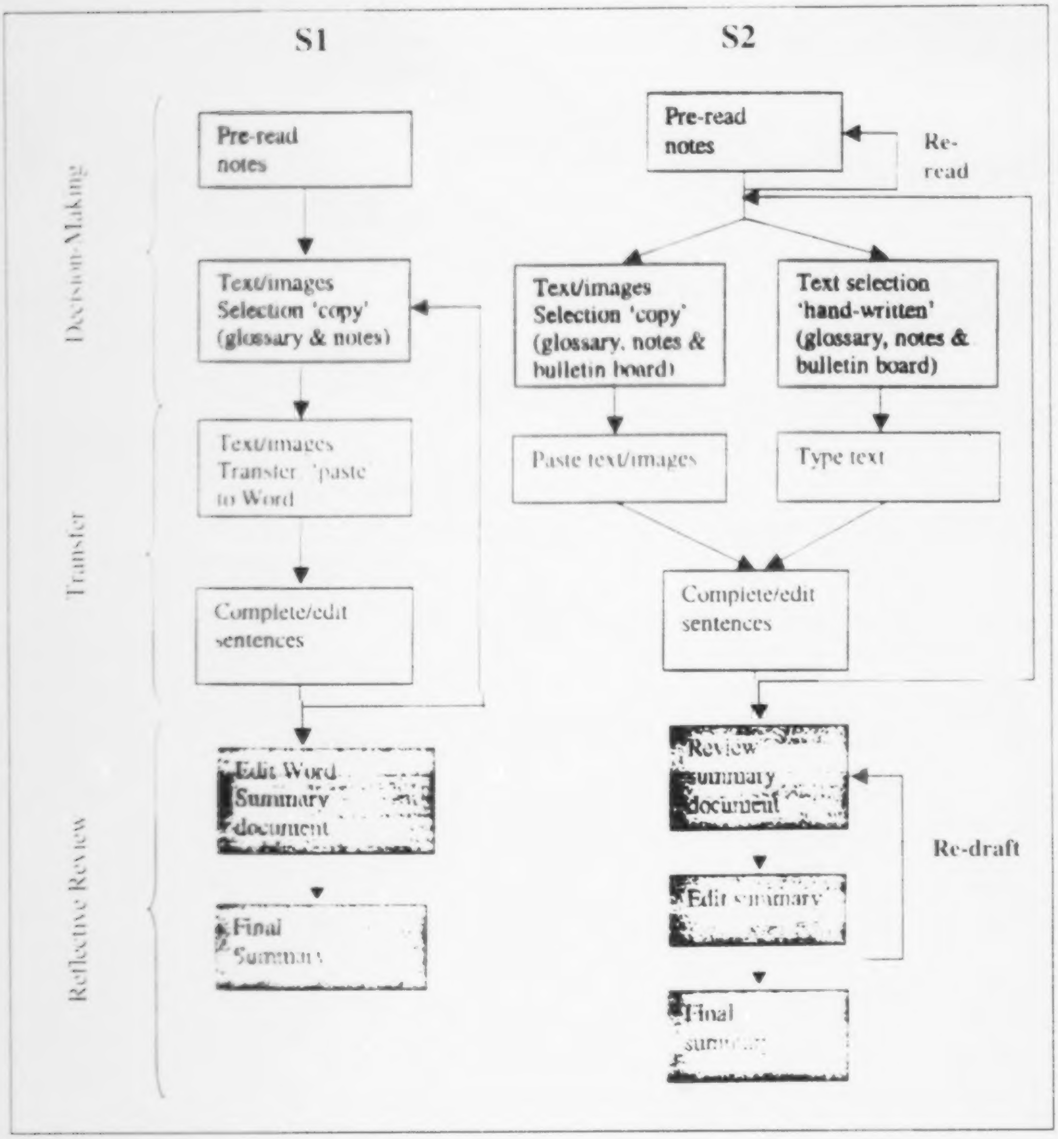

S1
S2
Decision-Making
Transfer
Reflective Review
Pre-read notes
Text/images Selection 'copy' (glossary & notes)
Text/images Transfer 'paste' to Word
Complete/edit sentences
Edit Word Summary document
Final Summary
Pre-read notes
Re-read
Text/images Selection 'copy' (glossary, notes & bulletin board)
Text selection 'hand-written' (glossary, notes & bulletin board)
Paste text/images
Type text
Complete/edit sentences
Review summary document
Edit summary
Final summary
Re-draft

Figure 3. Summarisation Process Models.

One possibility is to expand upon this work by synthesising a number of relevant interventionist strategies as further support mechanisms. The proposal outlined below is to use a Wizard of Oz technique (Maulsby et al., 1993) to prototype additional support designs before they are coded in software summarisation support aids. However, this study has proved invaluable in highlighting some of the issues to consider in the design of the necessary additional note-taking and summary writing support which are currently not met by the WebCT 'my-notes' facility.

Recommendations

The proposal is to introduce an artificial Learning Companion to the WebCT environment. It is proposed to adopt an Agent-based approach (Woolridge, 1999) to the design of the Companion. A suitable model of collaboration between student and companion was proposed by Chan (1988) : " *while one is working on a problem, the other is watching and ready to give suggestions if asked. If they both run out of ideas, then the teacher may*

BEST COPY AVAILABLE

interrupt ". In this case the problem would be that of constructing a summary document and the teacher Agent would be a human expert available on-line preferably synchronously but also asynchronously.

A suitable architecture is being designed for the Agent together with an investigation of appropriate technologies. It will need to act on the three stages decision-making, transfer and reflective review using behaviours derived from rules such as those proposed by Tawalbeh (1994, Fig. 3.12 p.79) in his summarisation model and the aforementioned collaboration model.

It is currently intended to prototype the Learning Companion utilising the Wizard of Oz approach mentioned above at CHALCS and other local schools. This will be used to investigate strategies, dialogue and personifications of the intelligent agent component.

Conclusions and Future Research

There is an urgent need to improve upon the current support afforded by the Virtual Learning Environment WebCT in terms of scaffolding student's summarisation. The study reported here was designed to investigate issues relating to the design of such further support. A number of recommendations were made as a result of the study such as the need to support considerably varying approaches to summarisation. These are currently being considered as part of the design of an artificial Learning Companion.

The desired outcome is a user-centred design of a summarisation Learning Companion which will be relevant not only to the current CHALCS context but to a wider audience of designers of Networked Learning systems.

Acknowledgements

This work is funded under ESRC Collaborative Case Studentship award in association with Chapletown and Harehills Assisted Learning Computer School (CHALCS). The authors wish to particularly thank Mr. Brainard Braimah (CHALCS director) and Dr. M.C. Mkpadi (CHALCS physics tutor) for making this research possible. Thanks also go to Roger Hartley for discussions on pedagogical design and for his role in authoring the Physics course material. We also thank Catherine Bennett for her role in the design and publishing of course material on-line within WebCT and to Pat Greenwood and Rosa Hall for much additional secretarial support.

References

Andrews, R. (1995). Teaching and Learning Argument. London, Cassell.

Ausubel, D. (1985). Learning as Constructing Meaning. New Directions in Educational Psychology 1: Learning and Teaching. N. Entwistle. Lewes, E.Sussex and Philadelphia, P.A., The Falmer Press: 333.

Qualifications and Curriculum Authority (1999). Introduction to Key Skills, Levels 1-3 in Communication, Application of Number and Information Technology. London.

Barker, T. (1998). Collaborative Learning in Virtual Learning Environments: Supporting High Quality Educational Interaction [linked with the Community Task Force, i.e. CHALCS]. Proceedings of Networked Lifelong Learning, Sheffield, University of Sheffield.

Barker, T. (1999). Community Based Virtual Learning : A WebCT Physics Course. Proceedings of WebCT99 : From Innovation to Implementation, Vancouver, Canada.

Barker, T. (1999). Integrating a Note-Taking Learning Companion Within the WebCT Virtual Learning Environment. AIED99 Workshop on Animated and Pedagogical Agents, Le Mans, France.

Barker, T. & Pilkington, R. (2000). Collaborative Learning in Virtual Learning Environements. Leeds, CBLU, University of Leeds. Technical Report 07/00

Chan, T.-W., Baskin, A.B. (1988). "Studying With the Prince" : The Computer as a Learning Companion. Intelligent Tutoring Systems 88, Montreal, Canada.

Johnson-Laird, P. N. (1988). The Computer and the Mind : An introduction to Cognitive Science. London, Fontana Press.

Lester, J. C., Converse, S.A., Stone, B.A., Kahler, S.E. & Barlow, S.T. (1997). Animated Pedagogical Agents and Problem-Solving Effectiveness: A Large-Scale Empirical Evaluation. AIED 97, Kobe, Japan, IOS Press.

Maulsby, D., Greenberg, S., Mander, R. (1993). Prototyping an Intelligent Agent through Wizard of Oz. INTERCHI93, ACM.

Mohamed, Z. B. (1996). An Evaluation of an Extra-School Science Programme in a Multi-Ethnic Community: A Computer Based Case Study. Computer Based Learning Unit. Leeds, University of Leeds: 372.

Ploetzner, R. Kneser, C (1998). Steps towards the acquisition of expertise: shifting the focus from quantitative to qualitative problem representation during collaborative problem solving. 20th. Annual Meeting of the Cognitive Science Society.

Ravenscroft, A., Hartley, R. (1998). Evaluation of Chapeltown and Harehills Assisted Learning Computer School (CHALCS). Leeds, University of Leeds.

Tawalbeh, M. (1994). Computer Based Methods for Improving Summarisation Skills in ESL Contexts. Computer Based Learning Unit. Leeds, University of Leeds: 296.

Teasley, S. D., Roschelle, J. (1993). Constructing a joint Problem Space: The computer as a tool for sharing knowledge. Computers as Cognitive Tools. S. P. Lajoie, Derry, S.J. Hillsdale, New Jersey, Lawrence Erlbaum Associates.

Woolridge, M. (1999). Intelligent Agents. Multiagent Systems : A Modern Approach to Distributed Artificial Intelligence. G. Weiss. Cambridge, M.A., MIT Press.

POSTER PRESENTATION

Choosing a virtual learning environment for the University of Bristol

Siân Bayne, Julian Cook, Ros O'Leary
University of Bristol
Email: sian.bayne@bristol.ac.uk

We are currently exploring the potential of, and practicalities involved in, the implementation of networked learning tools across the University of Bristol. Our project is to ascertain first the readiness of the institution for such an implementation and second, the form such an implementation should take.

An assessment of the expectations, attitudes and 'readiness' of our academic staff and students for networked learning will form the core of our evaluation – our poster presentation will report on the feedback we gain during this first stage, and present our conclusions as to the most appropriate ways forward. The presentation will cover findings which are specific to the University of Bristol, but will encompass issues which will be of relevance in other institutional contexts.

The second stage of our evaluation will involve looking in detail at specific Virtual Learning Environment tools and applications. In accordance with the approach recommended by the authors of the JTAP report *A Framework for Pedagogical Evaluation of Virtual Learning Environments*[1], we will be attempting to analyse the available features of selected Virtual Learning Environment tools alongside an appraisal both of the educational principles informing their design, and the organisational context within which any chosen tool(s) will be implemented.

Our poster will present the approaches we take to this second stage of the evaluation task, describing the evaluation frameworks we adopt and reporting on our conclusions. In particular we will be asking not only which Virtual Learning Environment tool(s) best meet the needs of our institution, but also whether a cross-institutional approach to such an implementation is appropriate within this particular context. Is the centralised provision and support of such networked learning tools the way forward, or should we be looking at ways to enable individual academics and departments to select the tools most appropriate to their specific teaching needs? Given the constraints presented by the need for interoperability and adherence to standards, is some kind of hybrid approach possible or desirable?

---

[1] Sandy Britain and Oleg Liber (1999) *A Framework for Pedagogical Evaluation of Virtual Learning Environments* (JTAP Report 41)

Institutional readiness for implementing network technology

Aidan Black
Dr Hazel Derbyshire
Jackie Knowles O'Keefe
Phil Poole
Merce Rius Riu
Dr Jie Shen

Experience from TLTP and FDTL projects increasingly indicates that the institutional change associated with the integration of learning technologies requires leadership, vision and a clear sense of direction from all levels of senior management. The embedding of technologies within an institutional framework is also characterised by a high degree of ownership of that change by the department directly responsible for the teaching (Mayer, 1997). Whilst developments need to meet the immediate needs of staff or departments they should at the same time should be 'top down' and demonstrate a clear vision of the role of ICT within the institutions strategic plan.

One strategy which can support strategic planning is the use of an institutional audit which seeks to elicit the current situational context and identifies the strengths and weaknesses across a number of critical success factors.

TALENT(Teaching And Learning using Network Technology) is a TLTP 3 funded project which collects knowledge and experience of using the web for teaching and learning institution wide, and shares this knowledge within a community of collaborating universities. Access to the TALENT materials and membership of the community of TALENTed universities is available without cost. TALENT's prime objective is to evaluate tools, support structures and strategies that will support HEIs implementing ICT in teaching and learning.

The four founding HEIs felt they had a range of different experience, strategies and tools which could be consolidated to provide a 'TALENTed' approach to institutional change with ICT. The programme proposed working with a further 8-10 joining institutions who would avail themselves of the TALENT resources and support, pledging evaluation data to inform the dissemination of the transferable approach to a wider audience.

At an early stage in the TALENT project it became apparent that an institutional audit was required. Initially it would enable the project team to benchmark the current status of the institution and subsequently to evaluate its implementation progress in the course of the project. It should also enable an action plan to be developed which would identify possible areas for development and identify places where TALENT tools or approaches would be useful.

The development of the audit tool

The audit TALENT developed had its roots in work that was undertaken by one of the TALENT team when working for the National Council for Educational Technology (NCET). Based on an extensive evaluation of a number of technology rich institutions . Capstick & Poole (1994) proposed that changes observed in educational institutions with ICT could be mapped onto a model of change developed by the MIT90s project (ICL 1992) within a commercial context. The model describes five levels of development which can be observed in institutions as they progressively integrate ICT within their organisational structure.

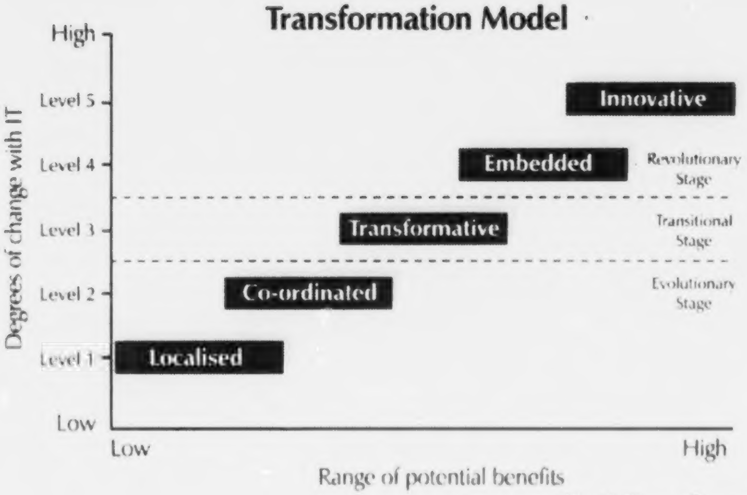

Transformation Model
High
Level 5
Level 4
Level 3
Level 2
Level 1
Low
Degrees of change with IT
Innovative
Embedded
Transformative
Co-ordinated
Localised
Revolutionary Stage
Transitional Stage
Evolutionary Stage
Low
High
Range of potential benefits

Fig.1 Transformation model

Levels of Development

Five levels of development in the use of ICT were established in the MITs 90 model, ranging from the speculative to the totally planned and wholly integrated. In an educational context, these were converted into five specific levels: *localised, co-ordinated, transformative, embedded and innovative.*

Localised

At the localised level of development we will expect to see largely uncoordinated activity but with pockets of good practice.

Co-ordinated

Many universities made substantial moves into this level when they moved responsibility for ICT deployment away from user-departments and placed it in the hands of an ICT committee or manager.

Transformative

The key to this stage is a recognition that the application of ICT to learning and to the business functions of the institution has the power to change processes - to alter the way that people go about the business of learning and the functions which support that learning.

Embedded

Staff and students will use ICT as a natural part of their day-to-day activity. At this stage staff will think nothing of consulting administrative systems for vital up-to-date information on students, courses and so on. ICT will play a large part in both the preparation for and delivery of lectures and electronic communication will play a significant part in tutorial support, along with internal and external links that were previously maintained by other means. Innovation in teaching and learning strategies may be accompanied by innovation in approaches to timetabling and resource allocation to ensure maximum use of ICT and other facilities.

BEST COPY AVAILABLE

The original work identified a number of 'critical success factors' which appeared to be influential on the progress of educational institutions. These covered areas such as:

- Management
- Staff development
- Curriculum/Administration
- Resources
- External links
- Evaluation

The factors exhibited a continuum which was mapped against each stage of development.

	1 LOCALISED	2 CO-ORDINATED	3 TRANSFORMATIVE	4 EMBEDDED	5 INNOVATIVE
Strategic Management	C&IT planning is left to local departments and individuals	Encourages a co-ordinated approach to C&IT development at Department level	The value of C&IT is seen as a key feature of the institution and there are moves to integrate it into the environment	At an institutional level C&IT is a vital feature of its ethos	Strategic commitment to C&IT in learning

Fig.2 Critical success factor mapped against stages of development

The critical success factors and the stages of development with ICT were arrayed against each other to form a matrix. When used with staff in an institution the matrix would provide a profile of an institution recorded as a bar chart.

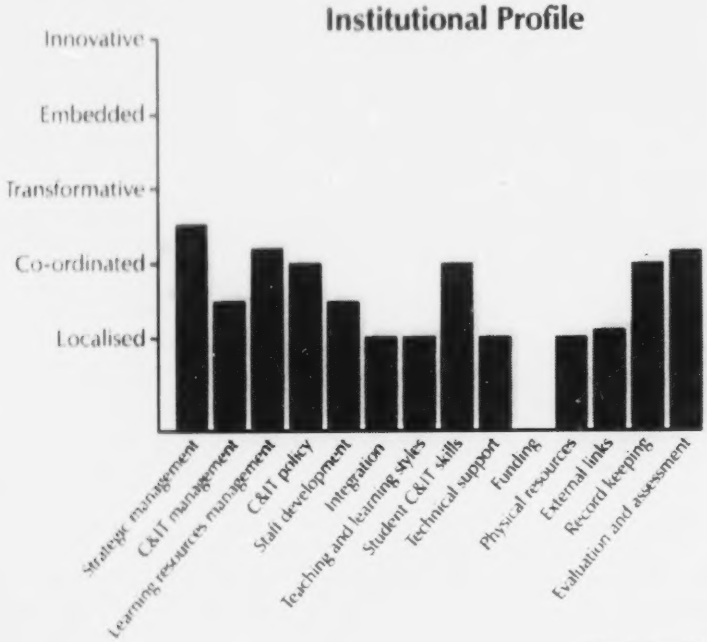


Fig.3 Institutional profile

BEST COPY AVAILABLE

Subsequently NCET devised a matrix for an FE/HE context. The TALENT project, using experience from the four founding institutions, updated and validated the matrix for HE institutions in the current climate. This matrix can be found at:
http://www.le.ac.uk/TALENT/book/c2p5.htm

As part of the TALENT programme the matrix has been tested in a further eight 'joining institutions' who have affiliated themselves to TALENT. The diversity of institutions in which the matrix has now been tested provides a degree of confidence with regard to its transferability to the wider HE sector.

Using the audit tool

Profiling the use of ICT with the audit tool should be a planned process. The first step is to select a group of staff from different areas of the institution, and with different levels of involvement in ICT. This group should include stakeholders. The role of the participating staff is to examine current practice in ICT usage, management, support, training and other activities, and to evaluate current practice. It should be recognised that staff will see the situation differently depending on their individual views and their position within the organisation. It is, therefore, sensible to have a balanced contribution from senior managers, administrative staff, academics and those from support departments.

The matrix could be given to members of the group in advance so that proper consideration is taken before completing the matrix. It will be more productive if the group is informed of the aims of the profiling exercise and how the results are to be used. Using the matrix to construct a profile can be done in group(s) or individually.

Each area of the matrix can be discussed by stakeholders in a group session. Areas of confusion could also be identified and cleared through discussion. A consensus, or as near as possible to it, should be agreed for each stage the institution has reached. This should be noted on a master copy of the matrix. The discussion and analysis that is engendered by this audit is valuable in itself.

The next step is to interpret the results collated from the exercise. The profile of the institution which emerges can locate strengths and weaknesses among the 14 areas. The individual responses may also raise some issues that are worth noting. People working in one area of the institution may rate all aspects of ICT consistently low while others may rate them consistently high. This could indicate an uneven distribution of facilities and/or support within the institution. People working at different levels may use different parts of the ICT system, which could also result in different ratings.

A SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis can alert senior management working in areas that need development and also inform other departments of staff development priorities. If the profiling is to assist changes in ICT use within an institution it should be integrated into the institution's strategic planning process or a ICT review. After the institution is able to identify strengths and weaknesses in ICT through the use of matrix profiling, the weaknesses should be noted and then used to inform priority areas that need attention. At the same time many institutions may not be in a position to address weak areas immediately, and it is more appropriate to make the best of the strengths to assist where possible.

The final step is to write a summary and distribute the summary result to the members of the audit group as feedback and to prepare the ground for forthcoming action within the institution. The profile can be a useful basis for devising strategies and planning actions on how to move the institution forward to the next phase.

It is also valuable to provide data in subsequent evaluation of the effectiveness of implementation strategies and the progress of the institution.

From the audit reports, it was possible to produce the following case studies.

Case Studies

Institution A

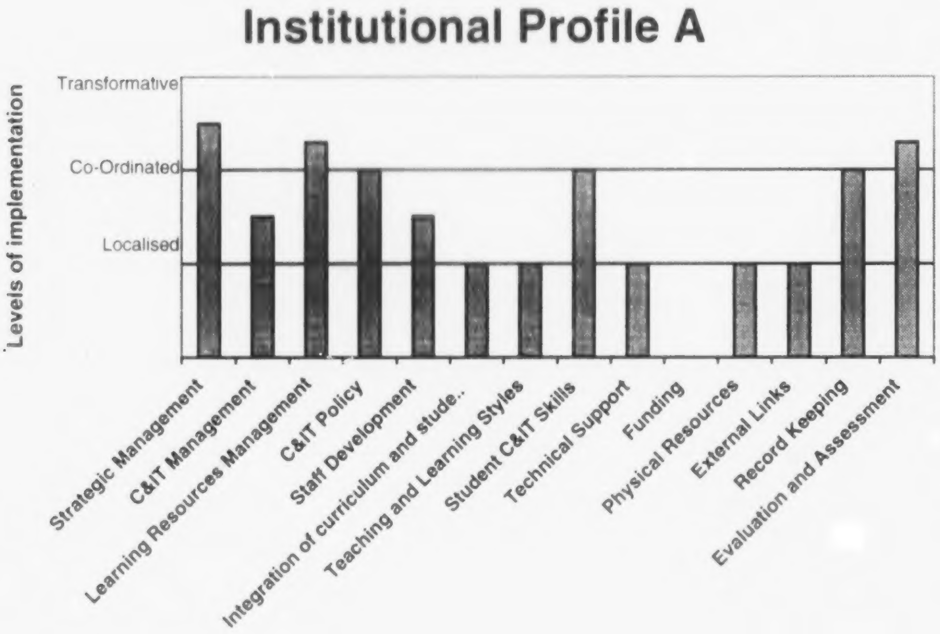


Fig 4 Profile A

At the commencement of the project in Institution A, there was a wide ranges of practice in the use of ICT in teaching and learning. A few departments have very active members of staff in supporting ICT and use it effectively in teaching activities. Some even design and develop their own software to pursue online activities. A few newly designed courses have ICT embedded in the delivery of teaching. However, there are courses and staff who prefer not to use any electronic resources in their teaching. At the commencement of the TALENT project, there were no teaching & learning strategies in place. Instead, there were two parallel provisions of ICT, centralised and departmental.

Staff development was organised for two weeks a year. There was no efficient help desk arrangements, The staff help desk system was still under development, although a student experimental help desk was in place. In house software was being developed for the purpose.

Events were organised to promote the use of ICT and other teaching technologies, but a significant part of teaching staff could not take part, because of different academic calendars. The institution was planning to introduce the Netskills materials for staff training. Limited materials were available online.

The institution has a common type of network infrastructure and access to the Internet was standardised throughout the campus. Students have access to all facilities. There are open access areas for computing provided in the library and in computer rooms within faculties where standard MS Office application software is supported by a central unit. Limited CBT/CAL is available on the network.

Students' ICT skills were partly embedded in the curriculum, but there was no central initiative to support the trend. Activities tend to be "bolt-on" and not fully integrated.

Technical support was limited and patchy, with acute staff shortages in the area. Currently, there are limited resources in supporting the use of ICT. The central IT service had approximately nine personnel.

Links with external institutions were mainly through personal contract by individual staff. There was only limited access to MIS information by a very few designated staff. There was a clear need for more integration of curriculum and student data, with the appropriate training for staff.

Coinciding with the start of the project, a new Principal circulated a paper entitled *Meeting the Information Needs* which he circulated to all staff. The vision was of an Internet based information system with the main emphasis towards supporting learning and teaching. Following on from this, an Assistant Director of Learning Resources was appointed . Her responsibilities include staff training and developing educational use of the Internet. In addition, the new unit of 12 existing people are now responsible for audio visual equipment, web development, and have helped to produce a learning & teaching strategy that is now in place.

At the time of audit , this institution was mainly at a localised level of development with largely uncoordinated activity, and pockets of good practice. Nevertheless, there was a strong transformative approach in the areas of Strategic Management and Learning Resources Management, produced by the vision of senior management and the appointment of the Assistant Director of Learning Resources . Network technology is now being used to transform processes, and the way the institution goes about its business.

Institution B

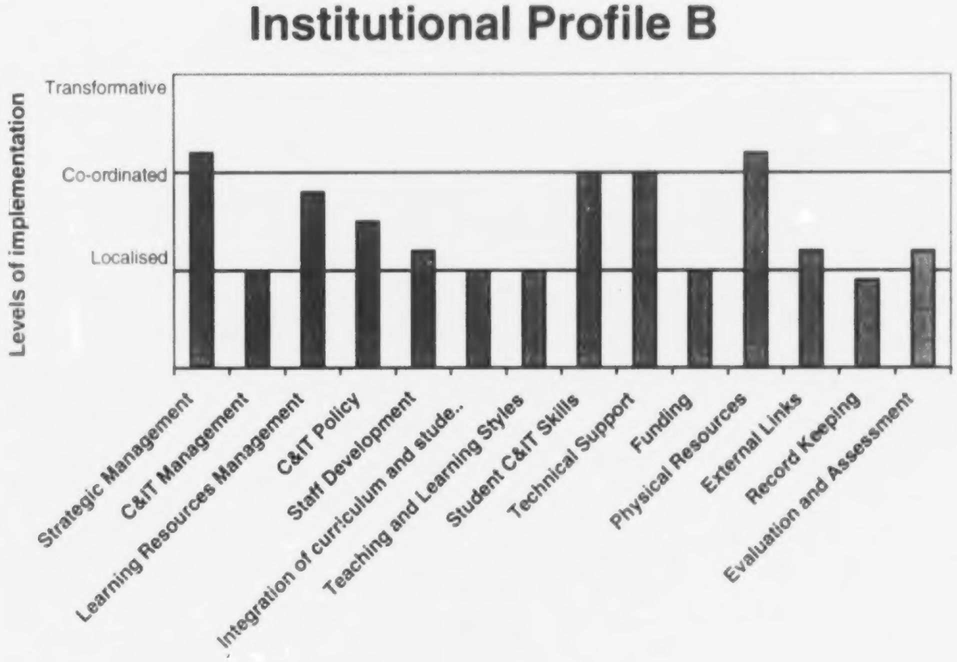


Fig 5. Institutional profile B

At the time of the TALENT audit, Institution B was just putting a Teaching and Learning Strategy in place.

As with Institution A, technical support was limited and patchy, with acute staff shortages in this area. The Institution had reached a level of standardisation of ICT provision in terms of hardware and software. Network facilities were being upgraded in the near future, but there was no strategic approach to the use and management of ICT, as yet. A working group was set up to develop a Strategy for Information and Communication, which had reached the final draft stages.

There was no overall Learning Resources Strategy. Instead there were two parallel provisions of ICT, centralised and departmental. There was currently a central move towards changing the curriculum to take account of ICT use, and a unit within the institution had been identified as having the remit for Staff Training and Development in this area. Lack of resources was identified as the major obstacle for implementing this brief, for which a programme was already in place. A previous IT Unit was lost and had not been replaced. There was a serious lack of computer training for staff. There are little or no teaching resources available. Students' ICT skills were partly embedded in the curriculum, but there was no central initiative to support this trend. There is excellent practice within the organisation, with a need for dissemination and implementation.

Student management data had been out of reach to academic for historic reasons. There was a clear need for more integration of curriculum and student data, with the appropriate training for staff. There is a mixed provision of departmental resources and open access areas.

Institution B is set clearly at the co-ordinated level. The development of the college LAN will clearly come into question, and its development will be seen as a mechanism for improving curriculum provision.

Institution C

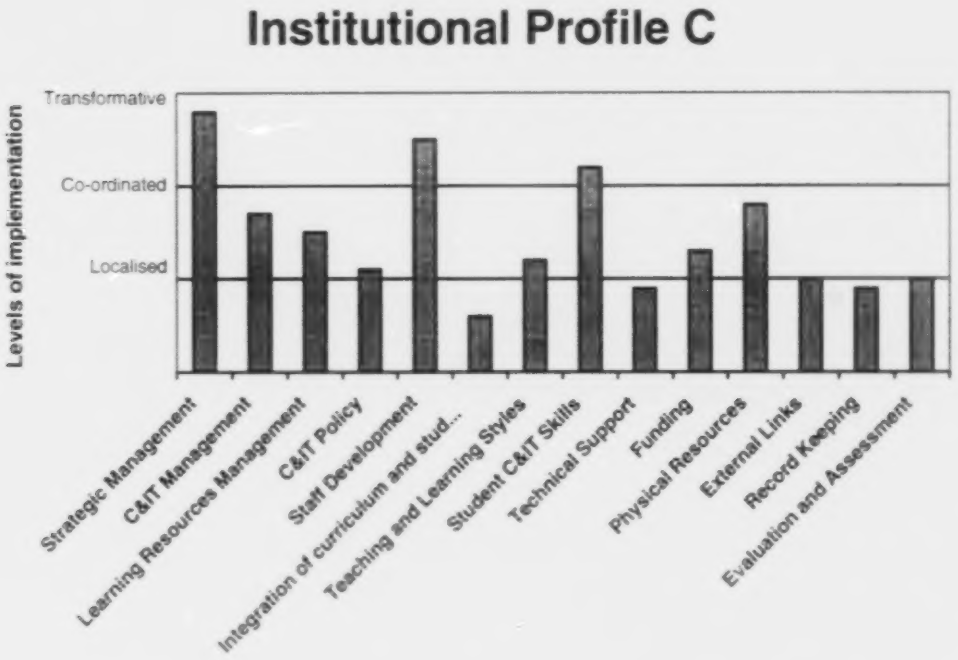


Fig 6 Institutional Profile C

From the audit, it became clear that members of senior management at Institution C were developing a clear vision, which was to be embedded in various strategy documents. These were to be led by an Information Strategy, of which a draft was currently being approved. Other strategies, such as those on Learning and Teaching and Learning Resources are being developed and are aimed to be coherent and complementary to each other. However, there was a lack of clear practical policies to follow these strategic visions. Lack of communication within theInstitution, meant staff and students were not fully aware of the strategic vision that senior management were placing on the use of C& IT. There were pockets of good practice within Departments.

The strength of the Institution lies with a strong awareness and emerging strategic commitment by its senior management to develop networked learning by implementing ICT technologies. Institution exists as a closely knitted community that could move forward in this direction rapidly and had the confidence to do so. However, implementation of network technology is largely being driven at a local level, with not enough strategic vision and communication from senior management.

Management of ICT facilities was co-ordinated by Heads of Service on an informal basis. Priority on support was driven largely according to external factors set by regulatory bodies. The Higher Education Institution's central networked facilities that support computing services and Internet access are open to all staff and students, but an integrated learning environment on the network was yet to be established. There was a perceived need of further up-take of ICT use at senior manager level. A staff development programme was in place and includes ICT content. Provision of students ICT training was course dependent and there was a common reliance on the use of facility guides and through peer help. Student access to computing facilities at peak day times was extremely limited at present resource level. This hampers the adoption and development of open and network-based curricula and learning styles.

Technical support of ICT facilities are provided by a relatively small team who operate mostly under their own initiatives and maintain the systems to the best of their ability at current staffing levels. There are no formal written working procedures or a helpdesk/fault-logging system and team experience plays an important role. This was not regarded as an efficient working practice, albeit with the very limited manpower that was available.

Like many other HE institutions, the institution's MIS systems are not integrated and are not at present used effectively to support curriculum development or automation of student management. The current system produces mainly hard copy records and provides very limited access to staff. The importance and usefulness of a unified MIS system was very much recognised, but the resource required to implement the systems fully excludes it from reality at the near future.

Analysis

There are common problems facing all three institutions in the implementation of network technology.

As a result of the auditing process some generalisations on the issues associated with implementing network technology in supporting teaching and learning can be drawn:

- technology support was patchy, dependent upon local circumstances;
- progress still depends upon availability of funding and the enthusiasm of particular educators;
- the learning environment in which technology was used remains fundamentally unchanged
- many academics lack confidence and skills in the full range of uses.
- development work was largely funded locally by schools and departments and there was no central fund for any such activities
- Students ICT activities are seen as "bolt-on" as opposed to embedded.
- Staff training was crucial
- Centralised implementation seems to be most effective

The future

In all three institutions, the importance of senior management's vision of developing network technology was a major factor. In Institution A, there was clear leadership and communication to all staff and students. This was done by the establishments of new roles/units for the purpose of developing educational technology for learning, and the development of a teaching & learning strategy. The Principal himself had recently obtained an ECDL. New structures had been set up, in spite of funding problems. Strategic initiatives had been organized. In this institution, the development of network technology was moving in a co-ordinated and cohesive manner. They have recently re-audited themselves and achieved substantial changes, as seen below

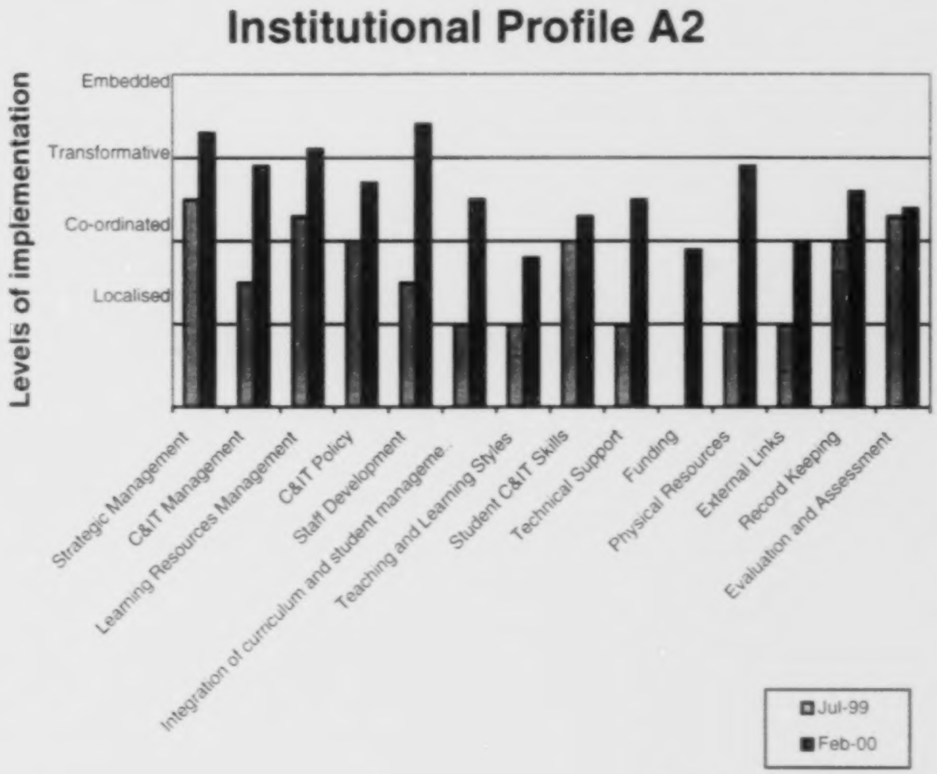


Fig 7 Institutional profile A2

Through this centralized, coordinated approach under proactive leadership, this institution is moving forward at a rapid rate in its development of networked technology for teaching & learning. It is limited mainly by resources.

In institution C, there was a clear need for a more effective approach to the development of Network technology. The Institution was seen to react to external forces, rather than moving ahead with its own priorities. There are no clear strategies in place. Staff are developing systems in a haphazard way, rather than in a prioritised organised manner.

Well organised staff development is also fundamental to network technology implementation, as is a Help Desk procedure. In Institution B, there is a clear need for more staff training to carry forward staff development. Institution A has moved forward very quickly in this area. We found that a small percentage of educators at the institution may take to the technology very easily, provided it was made available. This was the most important step in the process, to be accomplished with administrative help. But the presence of a small but enthusiastic set of people will not ensure success, unless the introduction is accompanied by policies that will ensure the utilisation of network technologies. Motivating factors include release time to allow educators to prepare their resources to go online.

Summary

The experience of auditing institutions, undertaken within the TALENT programme, illustrates that this strategy can provide a valuable discussion forum for staff, at a number of levels within the organisation, to share their perception of its current status. The resulting profile has been shown to be useful at a planning level to identify strengths and weaknesses and to indicate target areas where resources and strategies are likely to be most effective. There is also increasing evidence that re-auditing is useful in evaluating progress and the effectiveness of particular strategies as implementation proceeds.

References

Bates A.W. (1997) *Restructuring the University for Technological Change.* The Carnegie Foundation for the Advancement of Teaching. http://bates.cstudies.ubc.ca/carnegie/carnegie.html

Capstick, N. and Poole, P. (1994) *Managing IT: A Guide for Senior Managers.* NCET

Daniel, J. (1997) *The Mega-Universities and the Knowledge Media* London: Kogan Page
Harasim, L.et al. (1997) *Learning Networks.* MIT Press: Mass.

ICL (1992) *A Window On The Future: ICL briefing for management on the findings of the Mangement in the 1990s Research Programme.* ICL

Laurillard, D. (1993) *Rethinking University Teaching* London: Routledge

Maier, P. (et. al) 1997 Active Learning 6 *Using educational development strategies to integrate learning technologies* Banbury, Oxford : CTISS Publications

TALENT Team(1999) Book of Talent. Available from: http://www.le.ac.uk/TALENT/book/sitemap.htm [Feb 2000]

Talent Team(1999) *Matrix.* Available from: http://www.le.ac.uk/TALENT/book/c2p5.htm [March 2000]

Sommerlad, L. et al.(1999) *Synthesis of TLTP Annual Reports* Tavistock Institute: London

Warburton, S. (1999) *Factors affecting changes in the use of educational technology within HE establishments: Working document: Development of a TELRI Change Management Framework.*

Networked Professional Development: Issues for Recipients and Providers.

Nicholas Bowskill, Jonathan Foster, Vic Lally and David McConnell

Abstract: The Computer Based Collaborative Group Work (CBCGW) Project is based in the Department of Educational Studies at Sheffield University. The aim of the project is to help raise awareness and to support the development of practice amongst those interested or involved in collaborative networked teaching and learning. The Project team has delivered a range of different resources and activities to different audiences within Higher Education. This support, labelled as the Rich Professional Development Environment (RPDE), is one strand of the project. As part of the RPDE, this paper describes an online workshop for academics and a support initiative for staff developers. Finally some consideration is given to our collaborative networked teaching practice as another aspect of networked group learning and an emerging form of practice.

The project

The CBCGW Project is based in the department of Educational Studies at the University of Sheffield and Centre for the Study of Networked Learning. The project aims to support and research the development of networked group learning (for an overview of the project see Lally et al, 1999).

The project is conceptualised into 5 strands:

1. Rich Professional Development Environment (RPDE)
2. GroupWare Review
3. Virtual Professional Development Centre
4. Institutional Readiness for Networked Learning
5. Case Studies

In this paper, we describe the professional development needs of those interested or involved in networked learning and then go on to detail ways in which the CBCGW project is addressing the need to support both academics and staff developers.

Staff Development Needs For Networked Learning

There are growing expectations of staff to offer more flexible forms of provision using technology, yet often with little or no training or support (Lynch & Corry, 1998). To meet these expectations, there is a need for more staff development (Collis, 1997, Wills, 1998, McConnell, 1998). The range of professional development needs is complex and goes well beyond technical skills, to include pedagogical and managerial skills/knowledge. For instance, the provision of technology-mediated learning at an operational level indicates various professional development needs that include (Thompson, 1997):

- conducting successful group discussions
- new class management techniques
- managing online commitments with other responsibilities
- developing appropriate assessment strategies
- changing administrative processes

This places considerable responsibility on staff developers to provide appropriate forms of professional development that reflects the diversity of needs and different forms of possible provision. Indeed, the staff developers may also share the same professional development needs themselves (Isaacs, 1997). The CBCGW project is therefore interested in providing experiential support to both academics and staff developers. The project has developed the RPDE as one strand of the overall provision to address these needs.

The RPDE Strand

As part of the project, the RPDE strand provides information, tools and events. A range of information resources is made available on its web site (http://collaborate.shef.ac.uk). Various tools have been provided for different purposes including a discussion list (named Collaborate), synchronous systems and different conferencing technologies. A range of events have also been provided/planned by the project including a series of list-based group learning activities and an online workshop for mainly local academics (details below). We are also about to deliver another online workshop aimed specifically at staff developers.

The overall provision being made by the project is described in more detail elsewhere (Lally et al, 1999). In this paper, we review an online workshop already delivered by the project and then a support initiative for staff developers.

Online Workshop For Academics

As the first of a series of online events offered by the Project, we have completed the delivery of an online workshop for academic staff. The aim of this workshop was to raise awareness and provide experience of networked group learning strategies, using an experiential model. The details of the workshop and the findings are covered in more detail elsewhere (Bowskill et al, 1999). Here we offer only an overview of the workshop and findings. The workshop had 29 participants (including two from different institutions) and lasted 12 weeks. Various technologies were used including synchronous systems.

Research Method

The data from the transcripts of the online environment were analysed together with additional sources such as email messages and transcripts from a face-to-face meeting held at the halfway point. Questionnaires were also sent to participants after the workshop and responses were also added to the data collection. The analysis of each unit is given below followed by a brief discussion of some of the main issues.

The Findings

A detailed discussion of the findings has been presented elsewhere (Bowskill et al, 1999). Here we offer a brief summary of the main findings. They are:

- Continuity versus Scheduling of Provision
- Levels of Active Participation
- Difficulties in Decision-Making Online
- The Structuring of the Online Space
- The Value of Sharing Experience
- Developing Awareness of the Student Perspective
- The Form of Provision
- Transfer into Practice
- Experiential Approaches to Professional Development

Continuity/Scheduling of Provision

Although our provision allowed considerable flexibility, participation around exam time was still problematic for some people who had also planned to take leave shortly afterwards.

Levels of Active Participation

A core of people participated regularly across the whole duration while several others seemed to be spectators. This differed across the workshop but overall participation -meaning the input of messages to the discussion-was moderate to low.

Decision Making in Online Environments

We found that decision-making was difficult amongst a group of distributed participants who participated at different times thereby increasing the amount of time taken to complete collaborative activities.

Structuring the Space

From our workshop experience, the number of spaces in which learners work should be kept to a minimum to avoid confusion and delays. This problem appears to be exacerbated with learners new to technology.

The Value of Sharing Experience

The online workshop provided a flexible framework for participants to meet each other. This in itself was valued and provided additional opportunities to discuss ideas and good practice. In this case, we found that assessment issues were of particular concern along with the frequency of the tutor's responses to students.

Developing Awareness of the Student Perspective

Participation in the CBCGW online workshop gave academic staff the opportunity to gain insights into the experience of students in an online learning environment. This was greatly valued and caused people to reflect on current practice.

The Form of Provision

Some staff wanted to be told how to deliver networked group learning. This highlights different learning styles amongst academics and the need for providers to offer a range of formats and entry points in their overall provision. Discursive, collaborative and experiential approaches did not suit everyone.

> *"What I feel I need is a How To guide to do this i.e. meet my needs and at the same time see how I might advance what I do. Starting from thinking of a problem and then going on is no helping me."*

Transfer into Practice

There were a number of indications that experiences from the online workshop would transfer into the practice of participants in various ways.

> *"It has brought me face-to-face with...why some of my students were giving me a tough time...if nothing else it has made me change my mind about how we will tackle our own web stuff in October and that is incredibly valuable"*

More typical however were indications of interest in further exploration and development of some of these introductory experiences.

The Need for Experiential Approaches to Professional Development

Several people echoed this in our workshop commenting that there was a need for support from those having both technical skills and pedagogical skills. People thought /more provision of this kind was needed.

> *"It does worry me that the pressure is on to develop on-line distance-learning initiatives, without the infrastructure and the time that are really needed to deliver a good-quality experience for all concerned..."*

There is clear evidence, from our workshop and from the current practice elsewhere, of a considerable need for more support in this area of work. As Taylor comments "There appears to exist a professional development "blind spot"...in the preparation and support of teachers, especially those who work in distance education."(Taylor, J.C., 1997). The role of staff developers amongst others is therefore vital and the project has also sought to research and address this audience.

The Support Initiative for Staff Developers
Following a review of traditional support practices for academics interested in ICT, the Talisman Report (Alexander, W., 1999) pointed to the need for a forum in which staff developers could share practice and discuss issues arising from their support for academics wishing to explore the use of ICT. In addition, the report suggested that a "training the trainers" initiative would be needed in order to help staff developers address the pedagogical issues in ICT.

The CBCGW project is interested in providing support for staff developers for various reasons. The first of these is our recognition of the vital role staff developers play in dissemination of innovative ideas and practices. Secondly, our project seeks to develop a national centre for the support of networked group learning and as such, staff developers play a key role as local contacts and co-ordinators in any outreach programme.

We aim to try and develop experiential approaches to staff developers around networked group learning practices as part of supporting their involvement and understanding of the issues. We have therefore implemented a support initiative that aims to survey current practice in networked staff development, particularly using networked group learning practices and to develop the idea of further collaborative work between the project and this audience.

Description
Three regional workshops were organised for staff developers. These workshops were held at:

- Birkbeck College, London -17th Feb. 2000
- University of Edinburgh -29th February 2000
- Sheffield University -16th March 2000

Around 60 staff developers, from different institutions, attended this series of workshops. The aim of these workshops was to identify current networked staff development practices and professional development needs and to share these amongst both the participants in the workshop and the wider UK audience of staff developers. The findings from these workshops will be assembled into a report and made available online for participants to share and discuss.

Much provision for networked learning is delivered collaboratively. Networked collaborative teaching is therefore something recognised by the project as important and as a contribution to the research in this aspect of emerging practice we have begun to research our own practice.

Collaborative Networked Teaching
Computer networks offer considerable potential to support a team of tutors not only to deliver a collaborative provision but also to learn together as they do so. Team-teaching or collaborative support is a common feature of networked learning provision (Van der Veen, 1999; Bloxham, 1999; and Sherry, 1996 for example). As such, collaboration may be an additional professional development need for those interested in networked professional development. The provision of a learning event by a team may therefore be considered as authentic form of professional development for individuals and teams.

> *"My feeling is that learning technology support teams are in fact doing the most learning and on that basis they are engaged in a highly effective learning strategy."* (Harasim, 1990)

We are aware as a team that the collaborative provision of an online workshop represented a number of opportunities. Firstly, to constantly review and improve our provision for our audience and to explore and develop our own collaborative practice and understanding about working together as a team. Through a process of collaborative action learning we hoped to seize both these opportunities. We therefore began with a tape-recorded review meeting of team teaching prior to the start of our collaborative tutoring experience. Some of the early findings from the review meeting are outlined below.

Our Review Meeting on Team Teaching

We organised a review meeting with a member of our steering committee and another member of academic staff in the Centre for the Study of Networked Learning. This meeting was recorded on tape and transcribed for analysis. The meeting was an attempt to pool our experiences and thoughts about the practice of teaching with others. It was an attempt to identify issues of concern and interest before our first experience of tutoring together. Some of the issues arising from this review were:

- The Distribution of the Team
- The Relationship between Members
- The use of Technology
- The impact of team work on individual practice
- Training and support for Working in Teams
- Collaborative Teaching as a Learning Opportunity

The Distribution of the Team

The location of each member of the team was seen as something that might impact on the effectiveness and efficiency of the collaborative provision.

> *"Now the last one for instance, the management were all part time -they had other duties in other words- and they were on different floors and even being on different floors introduced a slight break in communications."*

It was also recognised that teams might work be increasingly remote from each other and that this was already happening.

> *"Many of the projects and increasingly many teaching teams will be in different institutions and different countries...certainly a lot of the online courses are being delivered by multi-national teams."*

The Relationship between Members

The team discussed the centrality of good working relationships between members.

> *" I can recall us all...meeting to talk about who the next team might be and that being really important because trying to work with people that you think you have something in common with and whose values you share ...... then it becomes a different experience and perhaps a richer one."*

The team was also aware that the nature of the relationships amongst team members could impact upon the experience of the learners.

> *"......it depends on individuals some people like it because it's a good safety net for them others find it difficult ... And it can cause real problems and it can cause problems for the student experience...."*

The use of Technology

Experiences of using technology amongst team members were shared. These included a means of bringing together separated tutors with a shared interest as well as small team collaboration.

> *"......all the new tutors ... talk to each other through FirstClass ......So they are in effect team working helping to become teachers in HE in a particular discipline."*

Technology was already being used to develop reflective practice amongst a team of tutors.

> *"...the staff team has a database for itself...where we meet 2 or 3 times a week in order to talk about whats happening in the course and we talk about whats happening as its happening - you know this thing about looking at our practice in action."*

There was a common awareness of the ways that technology could make individual tutoring public to other tutors. This was seen as controllable, beneficial.

> *".. In virtual environments, if that's the way you allow things to happen, then its possible to learn by looking at other peoples work in a way that I don't think is possible in face-to-face."*

The impact of team work on individual practice

It was interesting to see ways in which participants recognised that working with others had also caused further reflection upon individual practices.

> *"...one of the strongest influences of working in a team is ...... the effect on me of questioning and re-questioning my own actions and values some of which have changed as a result and some of which have been well not re-enforced but re-affirmed as a result."*

Training and support for Working in Teams

From our review it became clear that little support had been offered/available for tutoring in teams. Some views were given about where the emphasis of any support should be.

> *"Yes there are ways of working which you have to learn but I'm not so sure as the stress on the team as the dynamics of working collaboratively."*

The best way to develop and address professional development needs for collaborative networked tutors was also considered and the answer was plain.

> *"Be in a team!"*

Our own collaborative reflective strategy also aimed to support our own professional development. A further meeting has been scheduled to review what has been learned about our practice and the overall findings will be reported elsewhere in the future.

Collaborative Teaching as Group Learning

There was little doubt that teaching with others constitutes a real learning opportunity.

> *"......... We each had a set to tutor but it was a privilege if you like to have this window on another tutor and the way they went about interacting with the set members."*

> *"...because we could engage in a discourse as well. It wasn't just student-tutor interaction"*

Collaborative provision is an emerging form of practice for both academics and staff developers. Our review of our own previous experiences and concerns suggests this will become more common and that good working relationships will be important. Collaborative networked tutoring also offers a learning

opportunity and might be considered as effective professional development particularly where support is lacking from elsewhere.

CONCLUSION

This paper has reviewed the support for networked group learning made by the Computer Based Collaborative Group Work Project at Sheffield University. This support has addressed both the needs of academics and those of staff developers. This has been organised within the projects Rich Professional Development Environment and taken the form of resources, tools and events.

The project team itself has adopted a reflective approach to its own practice within an action learning framework. This approach has been used to explore our collaborative teaching practices in an effort to revise and constantly improve our overall provision whilst also addressing some of our own professional development needs. This collaborative tutoring practice is being explored amongst the team and is the focus of further research as a form of group learning itself. Collaborative provision amongst networked teams is emerging as an important area of work demanding further research.

References

Alexander, W. (1999). TALiSMAN Review of Staff Development Courses and Materials for C&IT in Teaching, Learning and Assessment. Available online at: http://www.talisman.hw.ac.uk/CITreview/cit_index.html

Bloxham, S. (1999) CBCGW Project Examples Collection Available online at: http://collaborate.shef.ac.uk/bloxham.htm

Bowskill, N., Foster, J., Lally, V., McConnell, D. (1999) *Professional Development Strategies for the Support of University Staff in the Adoption of Networked Collaborative Learning.* Workshop on Networked Learning, 10-11 November 1999, Higham Hall, Cumbria.

Bowskill, N., Foster, J., Lally, V., & McConnell, D. (1999) *A Rich Professional Development Environment (RPDE) for University Staff to Explore and Develop Networked Collaborative Learning.* European Conference on Educational Research 1999 Lahti, Finland 22-25 September 1999.

Collis, B. (1998). Implementing Innovative Teaching Across the Faculty via the WWW. Available online at: http://www.coe.uh.edu/insite/elec_pub/HTML1998/keynote.htm

Harasim, L. (1990) *Online Education: An Environment for Collaboration & Intellectual Amplification.* Harasim, L.M. (ed.) Online Education: Perspectives on a new Environment. Praeger, New York, Westport Connecticut, London

Isaacs, G. (1997). Developing the Developers: Some ethical dilemmas in changing times. *International Journal for Academic Development* Vol. 2(1) May 1997

Lally, V., McConnell, D., Bowskill, N. & Foster, J. (1999) Towards Generic Teaching and Learning Strategies through Computer Based Collaborative Group Work: Progress and Discussion. *Education-line -electronic texts in education and training.* Available online at: http://www.leeds.ac.uk/educol/documents/00001334.htm

Lynch, L. & Corry, M. (1998). Faculty Recruitment, Training & Compensation for Distance Education. Available online at: http://www.coe.uh.edu/insite/elec_pub/HTML1998/de_lync.htm

McConnell, D. (1998). *Developing Self-Assessment in Networked Lifelong Learning Environments.* Proceedings of Networked Lifelong Learning Conference, Sheffield University 1998.

Sherry, L., & Myers, K.M. (1996). Developmental research on collaborative design. *Proceedings of the 43rd Annual Conference of the Society for Technical Communication.* Charlottesville, VA: Society for Technical Communication. Available online at: http://www.cudenver.edu/~lsherry/pubs/dev_research.html

Taylor, J.C. (1997). Computer Assisted Distance Education: A Pedagogical and Professional Development Perspective. Keynote address, International Conference on Information Technology in Open and Distance Education, University Sains Malaysia, Penang, February/March. Available online at: http://cwis.usq.edu.au/dec/staff/taylorj/97usm.doc

Thompson, L. (1997). Professional Development for Online Learning. Available online at http://www.nw97.edu.au/public/papers/thompson.html

Van der Veen (1999) Applications of Information Technology: International Tele-Projects. CBCGW Project Examples Collection. Available online at: http://collaborate.shef.ac.uk/veen.htm

Wills, S (1998). Teaching Academics About Flexible Delivery. Invited Panel Speech for RIBIE98 Conference. Available online at: http://cedir.uow.edu.au/CEDIR/flexible/resources/wills3.html

What are the implications of the virtualisation of organisations and the emergence of knowledge management for management development?

Professor John G. Burgoyne
Department of Management Learning
Lancaster University Management School
Email j.burgoyne@lancaster.ac.uk

Introduction and Summary

The growing concern with knowledge management and the rapid emergence of virtual organisations are two of the main signs of a revolution in the functioning of organisations, which has profound implications for management development.

As firms have become learning organisations knowledge has become the critical resource both as the means of production – state of the art value adding processes, and as the product itself – what firms are selling is knowledge itself or goods and services with a high knowledge value content.

Organisational learning is the process by which organisational knowledge is created, renewed and utilised.

As part of this process organisations are becoming virtual – new e-commerce firms are created as virtual from scratch, surviving traditional firms are rapidly 'virtualising' themselves to survive and prosper.

There are three main aspects or organisational virtuality:

- A high proportion of virtual workstyles and workplaces for employees of all kinds.
- A high level of access to all organisational knowledge and resources for all organisational members – a dramatic fall in internal transaction costs if the necessary collaborative culture is achieved.
- The location of the organisation in its virtual context is increasingly critical – e-markets (both purchasing and selling), location in virtually managed just in time supply chains and industrial networks, web branding and imaging.

Organisational knowledge is differentially located – in people, records, culture, archives, technology, patents, expert systems, competency frameworks, training programmes, resource centres. There are new challenges in integrating and harmonising these.

For managers and employees there are fundamental new issues:

- Self-management and development as a knowledge manager and producer.
- Working in mixed generational teams with radically differing work lifestyle orientations – pre-generation X, generation X and post generation X.

- Linking personal knowledge and learning to collective knowledge and learning.
- Finding mutually beneficial understandings and practices over intellectual property ownership.
- Seeking and taking reward as equity as well as remuneration.
- Access to knowledge creating situations as a necessity for maintaining career viability.

These emerging trends set a totally new context both for the ways in which managers learn and may be helped to learn, and the ways in which careers will be shaped for the individual and 'managed' by organisations. Careers will be shaped more than by what people can and are able to learn.

Some of these implications will be explored and discussed.

Management Development in the Knowledge Managing Organisation

Knowledge management is a topic of considerable contemporary interest. It is the hot topic in the professional publications and conferences of the management and management development world.

It is linked to at least four other contemporary organisational phenomena:

> organisations for which the main product is knowledge itself or goods and services of which knowledge is the major added value component
>
> organisations in which the main kind of work for employees is knowledge work
> organisations learning how to learn
>
> the 'virtualisation' of organisations.

Knowledge management, knowledge intensive firms, knowledge work, organisational learning and virtualisation of organisations may be:

> 1.) the latest events in the continuously changing world of organisational life
>
> or
>
> 2.) the early stages in a quantum transformational change in the nature of business, organisation and management - similar in scale to the industrial revolution of the 19th century.

The argument of this paper is that those of us who are concerned with management development should take possibility 2 seriously. If we are now seeing the initial symptoms of an emergent revolution then this has fundamental implications for management development.

The organisations that thrive and survive in this era may be the ones where management development is based on the clearest vision of what is coming, and achieves the rapid changes in practices that this demands. The landowners, owners of capital and entrepreneurs that were the first to understand the emerging industrial revolution in the 19th century became the ones that lead it, and lead in it.

This paper first explores the nature of the revolution of which knowledge management is a part, then examines the implications for management development.

Knowledge Management

The argument of knowledge management is that organisational knowledge has become the critical resource upon which organisational effectiveness depends.

Arguably organisations have always been dependent on knowledge, but until recently it has been relatively stable, embodied in things like production lines through which it can be managed. In this form knowledge has been relatively easy to protect from exploitation by competitors.

Now the speed of development of new knowledge, the ease with which it can be imitated, mean that careful management of the production and use of knowledge is critical. The argument of knowledge management is that organisational knowledge has become the critical resource upon which organisational effectiveness depends.

Knowledege Management based Corporate Strategies

The knowledge approach is the most useful contemporary way of analysing strategic corporate options. The broad alternatives are:

- Rolling out a standard knowledge based package – McDonalds.
- Optimising the use of rich diversity of organisational knowledge: 'if Hewlett Packard knew what Hewlett Packard knew..' – organisations that have a wealth of experience, designs, patents only some of which are used in current products and services, but which can be accessed and applied to new problems.
- Being fastest at generating and applying new knowledge - R&D lead strategies, or relying on the creative abilities of core staff as in the media, advertising agencies, and design houses.
- Moving from goods/services provision to selling the knowledge underlying them. Organisations that are in leading positions in providing certain goods and services can sell, via consultancy, the ability to do this to other organisations, often as part of a global market strategy.

The Learning Organisation Contribution

Organisational learning is about generating, using and improving organisational knowledge. The learning organisation movement has preceded the knowledge management movement, and arguable led to it, in the sense that organisational learning produces organisational knowledge that then needs managing and utilizing.

The differing strategic options require different organisational learning processes. The 'standard package' approach demands that organisations learn how to roll this out through their own operations and franchises, to manage quality control, achieve local adaptation, and pursue continuous improvement in efficiency. Optimising the use of organisational knowledge means learning how to use the organisations 'memory' and how to identify opportunities for its application. The fast generation of new knowledge approach demands a clear understanding and fostering of the research and creativity abilities of the organisation. The exploiting underlying knowledge approach requires an organisation to learn about its own distinctive knowledge and how to apply it in new situations while retaining ownership of it.

Knowledge Management

The practice of knowledge management has been largely developed by the IT/IS function, whereas HR has largely championed organisational learning. Because of this the two may not be optimally integrated.

Two things are problematic:
the knowledge generation and use process
the diverse form, location and ownership of knowledge.

The knowledge generation and use process

There appears to be some agreement that the key steps in knowledge management and utilization are:

and reflection on it may
lead to *wisdom*
↗
the effects if which generate *data*
effective action
↗
knowledge which is the basis for
↗
information which is reflected on to produce
↗
data is collected, stored and processed to create

Data gathering and processing is now massively speeded up by IT/IS. Knowledge, application and wisdom are human learning processes - which are massively challenged by these new processes.

There is arguable a change of type occurs between information and knowledge. This is the point at which human understanding, intuition, judgement and sense making comes into play.

The diverse form, location and ownership of knowledge

Organisational knowledge exists in diverse *form*, is diversely *located*, varies in its natural *mode of 'ownership'*, and varies in its *susceptibility to dissemination and control.*

Organisational knowledge is located in:

1. people's heads
2. technology and procedures
3. the tacit abilities of practitioners
4. archives, records, patents, reports
5. organisational culture.

For organisations to make use its collective knowledge it has to relate, integrate and use these differently located and formed types of knowledge. These different kinds of knowledge vary in their accessibility to conscious use and their tendency to naturally belong to individuals or organisations. 1,2 & 4 are relatively accessible to conscious analysis and control, 3 & 5 the reverse. 1 & 3 belong naturally with individual people, whereas 2,4 & 5 are collectively located.

The Virtualisation of Organisations

The internet is catching on three times faster than television did when it was new, and seven times faster than radio when it was new. E-firms are achieving leading positions at unprecedented speed - e.g. Amazon. Traditional firms are adopting e-practices equally fast. E-firm start up is a goldrush phenomenon; E-firms are valued on promise way beyond current revenues. E-workers are keen to work for maximum equity stake and survival salaries. This is the new phenomenon of equity culture, employees wanting material acknowledgement that they are or own the critical means of production – their own knowledge and brainpower.

There are three aspects of virtual organisation:

1.) Virtual work process and workplace for a high proportion of employees - workstations and remote working.

2.) High levels of accessibility to all organisational information and resource by a high proportion of staff.

3.) Firms dealing with customers, suppliers, labour market remotely, and significantly 'located' in virtual reality, e.g. on websites in virtually managed networks and supply chains.

Management Development in the Virtual, Knowledge Managing, Learning Organisation

The significant features of this cluster of changes involving knowledge management, organisational learning and virtualisation are:

- The dramatic speeding up of data collection and information processing, putting massive pressure on the human capacity for sense making and action taking.
- The dispersal of many of the key asset of the organisation away from organisational ownership and control - as this asset becomes knowledge - and a high proportion of the dispersal being towards members/employees.

What are the implications of all this for management development?

Some hunches and inferences:

Working in mixed generational teams with radically differing work lifestyle orientations – pre-generation X, generation X and post generation X. Contemporary organisations have members who, because of the rapid changes in social and organisational life, have very different expectations about work, careers and learning. Employees with conventional ladder climbing career expectations mix with people with a background in the rebellious attitudes to work and institutions from the '60's, the gentle and less aspirational generation X, the self-interested yuppies of the 80's/90's enterprise culture, and less materialistic but game-winning oriented e-entrepreneurs of the new millennium. Management development systems that deal with the facilitation of learning and career development processes for organisations have to accommodate this variety of work and life styles, or, through recruitment and de-recruitment 'specialise' in a limited set of these strata of work/lifestyles.

Linking personal knowledge and learning to collective knowledge and learning. Because of the differing forms and locations of key organisational knowledge, as outlined above, management development systems now have to have strategies built into them to both foster the creativity of individuals and bring the product of this into collective application in organisational settings. This has to be done with an awareness that employees are now becoming increasingly aware that their own knowledge and intellectual abilities are their own main asset, and hence have to be protected, nurtured, and marketed from a personal point of view.

Finding mutually beneficial understandings and practices over intellectual property ownership. In the formal and psychological contract of employment, it is becoming increasingly important that clear understandings about investment in the creation of, ownership of, sharing of return from the exploitation of, intellectual property, are dealt with explicitly and with perceived fairness.

Seeking and taking reward as equity as well as remuneration. The newer generations of employees, born to the new world of learning, knowledge and virtualisation, are bringing equity culture to the employment, learning and career development equation. The new expectation is to have a formal, contractual share in the ownership of the means of production, and a consequent share in the surplus value created by its utilisation. It is more than likely that this new model will appeal to some of the previous generations, as it becomes more clear-cut.

Access to knowledge creating situations as a necessity for maintaining career viability. The situation for corporate management development is changing rapidly from one in which managers have to be persuaded to learn in order that they can be useful in a different future, to one in which managerial employees are demanding, as a condition of employment, that they are involved in work that is developmental for themselves and their careers, and with reasonable access to qualification and non-qualification bearing formal learning opportunities.

Corporate management development, as part of the human resource strategies of corporations, has to work either to the agenda of making the relatively centralised traditional form of organisation work in the new circumstances, or going over to the newer forms of networked organisational life which, some believe, is the more natural arrangement for the new situation.

The former option requires that the corporation secure its future by getting a significant proportion of the knowledge on which it is dependent into corporate ownership and control. From a management and organisation development point of view, this gives strategic significance to such activities as creating expert systems (so that the corporation can survive the departure of specific experts), establishing competency frameworks (so that the corporation retains the ability to re-create key employees) and establishing corporate data bases (so that the raw material of organisational learning is secured for the organisation).

The alternative to taking the knowledge from the people is keeping the people with the knowledge. Locking people with valuable knowledge into the organisation can be attempted through formal contractual arrangements; reward systems, which include deferred benefits, the fostering of strong culture of loyalty. In making these arrangements the incentive and material support of learning and development have to be maintained.

New forms of network organisation may provide an alternative to these approaches, in which individuals and small groupings network to achieve the same ends as large corporate bodies without the need for complex management development arrangements. However it seems likely that the countervailing forces of the expanded opportunity for the learning/knowledge managing/virtual organisation to achieve economies of scale in the use of knowledge resources, and co-ordinate the delivery of global value chains, will in many cases lead to the creation of even larger and more global corporations (see for example the America On Line, Time Warner, EMI merging). The future is likely to lie with highly dynamic small firms and super-corporations, with the latter having some of the characteristics of network organisation in their internal structures and processes. Both of these are likely to demand a new kind of leadership ability to create and realise visions, and influence events through charisma, the ability to understand complex and dynamic systems and to influence with less use of formal authority and power. A major challenge to corporate management development will be to realise this new leadership lead management style.

Effective Delivery of On-Campus Networked Learning: Reflections on Two Case-Studies

John Cook and Tom Boyle

School of Informatics and Multimedia Technology, University of North London, 166-220 Holloway Road, London N7 8DB. Email: j.cook@unl.ac.uk and t.boyle@unl.ac.uk

Abstract: This paper compares the experience of the two studies. In the first study on-line group work was structured around the production of essay-style critiques and the development of prototype multimedia resources. The second study describes an approach to designing on-line interactions between tutors and students that aimed to promote critical debate about an assessment task. The paper then sets down a framework of five key issues that markedly influence the effective delivery of networked collaborative learning in a campus context. The paper concludes by suggesting that if pre-delivery planning of networked learning gives detailed consideration to these issues, then the teaching and learning experience will be greatly enhanced.

Introduction

The purpose of this paper is to identify and explore key issues in the effective delivery of campus networked learning. The first case study, at Manchester Metropolitan University, involved networked, collaborative work carried out by conversion M.Sc. students. The second study, at the University of North London, involved sixty-four second year undergraduate multimedia students.

Following a description of the two case studies, we present a comparison of the experience of these two studies. This comparison led to the identification of a set of five key issues to be considered when implementing networked on-campus learning. The first four issues are concerned with the internal module design and the nature of the interventions. The fifth issue involves external concerns.

First case study: Manchester Metropolitan University

The complementary use of communication-based pedagogical re-engineering and interactive multimedia learning provides a significant opportunity to develop advanced learning environments. The aim of this project was to develop and evaluate such a learning environment.

The implementation of learning technology has involved interventions on two main dimensions: producing enriched courseware, and re-structuring classroom practice (Collis, 1997). This project involved complementary interventions on both these dimensions. The project was conducted with twenty-six M.Sc. students studying a module on multimedia systems design. A multimedia web site was produced to extend the module courseware. The students also engaged in Web-mediated group collaborative work which involved a critique and extension of the courseware materials.

The multimedia web site, the 'DFML' site was designed to complement the book 'Design for Multimedia Learning' (Boyle 1997). The book remained the main medium for the structured exposition of underlying concepts and theoretical structures. The function of the site was to provide a learning experience that could not be supplied by the book, e.g. by providing interactive examples that illustrate concepts, and providing access to source materials on the Web. The view was that the site and book together should provide a richer learning experience than either could alone.

The DFML site was designed so that it could be incorporated as a courseware component within class level electronic support environments, such as WebCT. WebCT is a commercial 'classware' product for the Web. It supports the provision of hypertext notes, on-line course calendars and on-line quizzes. It also provides a bulletin board facility that supports group conferencing. The tutor is provided with tabular information based on the automatic logging of student activities. The tutor can thus keep track of student progress, including student contributions to discussion groups.

In the spring 1999 semester the DFML site was introduced into the course. The students were given access to a new Web site. The home page for this site contained two main links. The first link was to the DFML Web site; the second link was to the bulletin board facility in WebCT. The students were organized into small groups. Each group was set up as a separate discussion group in the WebCT bulletin board facility. The students were asked to work cooperatively on two tasks: to produce on-line critiques of the chapters in the book/site, and to produce a small multimedia resource to illustrate a topic in the book/site.

The evaluation entailed a mixture of quantitative and qualitative methods. This mixture of methods provides summary numerical data supported by richer insights (England and Finney 1999, Atkins 1993). A questionnaire was used to gather information on the students' assessment of the DFML site, and the use of electronic group work using WebCT. This questionnaire was followed by focus group discussions.

The evaluation indicated that students found the group bulletin board facility in WebCT very easy to use. The overall median score was 3.5 out of 4. Observation and talking to students throughout the course showed that the group conferencing was very popular. This view was re-inforced by student comments in the focus groups. There was a mixture of full and part-time students on the course. The flexibility of structured electronic communication was especially appreciated by the part-time students. It helped them to keep in touch throughout the week with the full-time members of the group.

From the tutors point of view the use of WebCT was a very useful innovation. The tutor was entered as a member of each group. He could thus keep track of the activities within the groups. These activities included the number of communications sent and read in the group bulletin boards. The logging facilities in WebCT made it easy to produce summary reports on the students' activities. This knowledge provided the basis for greater confidence in allocating assessment marks to the groups.

In overall terms the project previded integrated support for students of multimedia design on a series of layers. The top layer of support was provided by the use of computer conferencing to support collaborative group work. This was a successful innovation for both the tutor and students. The main courseware, the DFML site, was designed to complement hard copy text and provide enriched access to multimedia experiences. The integration of the book, DFML site and computer conferencing seemed to work well. The multimedia resources providing access to sound, video and animation elicited positive reactions from the students. The process of allowing the site to be updated by its users requires further work and exploration.

Second case study: University of North London

The second study, at the University of North London (UNL) in 1999/2000, involved sixty-four second year undergraduate students. These students were following a module on 'Communicating via Multimedia'. The module web pages can be found at:

http://www2.unl.ac.uk/~exbzcookj/IM220/intro.htm

Participants in the module were involved in assessed on-line discussion groups that aimed to drive the learning (Knight, 1995), foster a 'community in inquiry' (Lipman, 1991) and provide an opportunity for vicarious learning (McKendree et al., 1998). A community of inquiry is teacher-guided; it places an emphasis on social interaction and cooperative learning, and it involves reasoning and judgement about knowledge. The starting assumption for vicarious learning is that much real learning occurs through observation of other learners engaged in active dialogues.

On the module students had to complete two assessment tasks, each carrying equal weighting (there was no exam). The focus of this section is assessment one, which involved groups of students cooperating to devise and apply criteria for web site evaluation. We were particularly keen to design the interactions with students on the module in such a way that would promote critical debate about the assessment task. Our initial idea on the module was that the assessment would both meet some of the module learning outcomes and drive some of the learning (Knight, 1995). The learning that the assessment one was trying to foster was critical thinking and argument (assignment two had as a learning outcome some critical evaluation task, so this first assignment was also preparing students for this).

A live debate relating to the assignment would not, in the first author's view, have taken place if students were not motivated in some way. Consequently, the marking scheme (out of 50) for the assignment included 30% for group work and 20% for individual work. The individual marks were to be allocated as follows:

Individual contributions (to online debate)
10% ability to answer questions
10% taking a lead in the discussion, showing awareness of the issues.

Students were asked to make at least three postings to the online debate.

The evaluation of the module made use of an anonymous questionnaire with space for additional comments. Sixty-one out of sixty-four students taking the module completed the questionnaire. Part 1 and 2 of the questionnaire had 11 questions that related to the web site and the online debate. Part 3 of the questionnaire is not dealt with here. Each of the 11 questions in Part 1 and 2 asked the student to respond with a score between 1 and 4, where 1 was 'very poor' and 4 was 'very good' (or some equivalent wording appropriate to the question). The full questionnaire results can be viewed by following the link provided at the top of the module web page (the address is given above).

For a 10 day period for the assignment there were around 400 postings in the online debate. The quality of dialogue varied (of course) but student feedback via the module evaluation was generally good. Most of the students were reasonably satisfied with the web pages and conferencing used on the module. Table 1 shows the total student responses to all 11 questions, by score category (1 to 4) and expressed as a percentage of the total number of question responses (i.e. 11 x 61 = 671). On a range of issues a total of about 67% students rated the web site and conference as good to very good (i.e. the sum of Score 3 and Score 4).

Table 1: Student scores as a percentage of the total responses

Score 1	Score 2	Score 3	Score 4
5.7	27.4	43.4	23.2

Questions 5 and 6 in Part 2 of the questionnaire related to the online debate:

> *5. The module conference was meant to give you an opportunity to get involved in a critical debate. To what extent did it succeed in this aim?*
>
> *6. How useful did you find the ability to read the debates that took place in the threads for other groups?*

Table 2 shows the total student responses to each question, by score and expressed as a percentage of the total number of responses to that question (i.e. 61). The response to Question 5 shows that about 56% of the students thought that the conference was good or very good at meeting its aim. The response to Question 6 shows that about 69% of the students thought that the ability to read other students' debates was a 'good' or 'very good' opportunity for students. The response to question 6 is positive indicator that work, in the area of vicarious learning, may in future be welcomed by students.

Table 2: Student scores for specific questions

	Score 1	Score 2	Score 3	Score 4
Part 2 Question 5	6.6	37.7	39.3	16.4
Part 2 Question 6	1.6	29.5	42.6	26.2

However, the above generally positive results must be seen in the context of additional comments made by students on the questionnaire. These comments highlighted the fact that a major problem faced by the students was the constant crashing of the network. This in turn frustrated students as they tried to use the conferencing facility. Furthermore, individual comments made by students were not always positive with respect to the module web site and online debate.

Key issues in the implementation of networked on-campus learning

In this section we set down a framework, based on the experienced gained from the two case studies, of five key issues that markedly influence the effective delivery of networked collaborative learning in a campus context. Briefly, the five issues are:

- managing the relationship between new and traditional pedagogical techniques
- the task goal set by the tutor
- management of motivation and assessment for a particular student population
- importance of the delivery environment
- evaluation of the effectiveness

The first issue is managing the relationship between new and traditional pedagogical techniques in the learning environment. The first study used a mixture of traditional (e.g. textbook) and new resources in the learning environment. The detailed exposition of underlying theory and concepts was conveyed through the textbook. The web site acted to complement the book by providing access to multimedia illustrations and interactive examples. This combined courseware was in turn embedded in a class organisation that was augmented through the use of electronic communication. The skills required to act as an online tutor are different to those required in face-to-face tutorials (see JISC/CALT, 2000, for detailed guidelines). Liaison with other tutors (when involved) in an online debate needs to be orchestrated. Tutors need to have a clear picture of the skills required when responding to a large number of students in a time constrained, assessed, online debate (in the second case study, each student could have potentially made at least 3 postings each over 10 days). The first author of this paper developed a tactic of 'targeting', where people who had contributed once or not at all were targeted with questions in order to help get their number of postings up to the required 3 postings. The number of postings made by the two module tutors in the second case study differed on a numerical basis, with the first tutor (the first author of this paper) making 103 postings and the second tutor (not an author of this paper) making 34 postings. It is fair to comment that the second tutor did engage in some quality interactions. However, online tutors must be forewarned that it is advisable for tutors to expect to mix their *interaction style* between that of targeting low contributors with short questions and 'quality time' style interactions (i.e. reflective and discursive dialogue).

A second important issue is the task goal set by the tutor. Networked learning may be used as a new means of delivering traditional learning targets or may be used to promote new learning goals such as discursive argumentative skills, as was the case of the second case study.

A third issue is the management of motivation and assessment for a particular student population. The prior knowledge and motivation of students clearly directly impacts on the ease or difficulty of getting students to use on-line collaborative learning. This directly affects the degree to which extrinsic incentives need to be applied to motivate the students. Both studies used the assessment criteria to some degree to motivate students to contribute to the on-line discussion groups.

Fourthly is the issue of the importance of the delivery environment. There are relative advantages to be obtained from using an integrated support environment, used in the first study, as compared with a hand-crafted delivery environment as used in the second study. For example, in the second case study it was found that Netscape Collabra did not assist the course tutors in tracking students who were not making contributions to the online debate. This was done 'manually' by the first author and then a list of the names of non-contributors was posted on the notice board (one colleague described this tactic as 'naming and shaming'!). By the end of the 10 days period for the assignment in case-study two, only 6 out of 64 students failed to make a contribution to the conference. On the other hand, an environment like WebCT provides essential tools that automate the process of tracking students.

The final issue is the evaluation of the effectiveness of the delivery of on-campus networked learning (this includes issues relating to infrastructure), plus proposals for redesign. In terms of the second case study, we feel that the approach taken to the assignment on the module gave students from a variety of backgrounds the opportunity to engage in serious critical debate. A future aim on Communicating via Multimedia could be to make these dialogues re-usable, as a new kind of learning resource. Unfortunately, student attitudes, as revealed by a questionnaire, do not give us any indication as to the quality of the debate that took place. Of course, in the second case study the marks allocated, and feedback given, by the tutors for individual student contributions do give some measure of the 'quality' of the interactions. However, such feedback will not reveal potentially useful information on the patterns of exchange between tutors and students. Future work intends to address this issue by conducting dialogue analysis of the conference interactions using a technique described in Cook (1998).

Conclusions

We conclude by suggesting that if pre-delivery planning of networked learning gives detailed consideration to the first four of the issues described above, then the teaching and learning experience will be greatly enhanced. Furthermore, the evaluation of these changes post-delivery (our fifth issue) can provide data for re-designs that capture the changing nature of the student population and the delivery environment.

References

Atkins M. (1993). Evaluating interactive technologies for learning. *Journal of Curriculum Studies*, 25, 333-342.

Boyle T. (1997). *Design for multimedia learning.* Prentice Hall.

Collis B. (1997). Pedagogical reengineering: a pedagogical approach to course enrichment and redesign with the WWW, *Educational Technology Review*, Autumn/Winter 1997, No. 8.

Cook, J. (1998). Mentoring, Metacognition and Music: Interaction Analyses and Implications for Intelligent Learning Environments. *International Journal of Artificial Intelligence in Education*, 9, 45-87.

England E. and Finney A. (1999). *Managing multimedia: project management for interactive media*, 2nd Ed. Addison-Wesley.

JISC/CALT. (2000). *Effective networked learning in higher education: notes and guidelines.* Available from http://csalt.lancs.ac.uk/jisc/advice.htm

Knight, P. (1995) (Ed). *Assessment for Learning in Higher Education.* London: Kogan Page SEDA Series.

Lipman, M. (1991). *Thinking in Education.* New York: Cambridge University Press.

McKendree, J., Stenning, K., Mayes, T., Lee, J., and Cox, R. (1998). Why Observing a Dialogue may Benefit Learning. *Journal of Computer Assisted Learning*, 14(2), 110-119.

The authors are members of the Adaptive and Interactive Multimedia Research Group (see http://www.unl.ac.uk/simt/aim/).

A Methodological Approach to Networked Collaborative Learning: Design and Pedagogy Issues

T. Daradoumis & J.M. Marquès
Open University of Catalonia
Av. Tibidabo 39-43
08035 Barcelona
Spain
e-mail: adaradoumis@campus.uoc.es
jmarquesp@campus.uoc.es

Abstract

This work presents a report on research carried out in the field of networked collaborative learning. In particular, we present a theory/model-based approach applied to a distance education course that is developed and taught in a virtual learning environment. In this educational practice, our objective has been twofold: first, to improve distance teaching and learning, and second, to facilitate social interaction among students and between tutor and students via the Web. To that end, our research approach has been based on the following actions: First, we analysed the goals, needs, expectations and preferences of our students, based on a previous pilot experience on distance collaborative learning, in order to understand what is actually happening in networked learning when collaboration becomes an integrated part of the whole learning process. Second, we proceeded to the design, development and implementation of a new pedagogical practice, called Virtual Study Group, to encourage and enhance learning through collaborative construction of knowledge and reflective interaction which contribute to a deeper understanding of the course contents. The paper focuses mainly on the latter. Finally, we provide a critical analysis and evaluation of the outcomes of this experience and of the many issues arising from applying this collaborative pedagogical practice to a virtual learning environment.

1. Introduction

Supporting quality teaching and learning has been one of the critical issues in distance education. The rapid development of the information and communication technologies has initiated a shift away from conventional distance learning to networked learning. The result of these technological advancements has given rise to virtual learning environments or virtual campuses where the communicative process is more central. Following this line, the Open University of Catalonia (www.uoc.es) has built a large and complex organisational virtual campus that provides an innovative pedagogic model for distance learning and teaching.

In this broad networked learning community infrastructure, our work seeks to investigate and facilitate learning and social interaction. In particular, we have started exploring the possibilities for new forms of learning and teaching by proposing a methodology design that promotes and encourages learning and collaboration through smaller communities of learners working together. Our involvement in this project is justified by the following arguments.

In the context of distance learning, one of the students' critical problems is the feeling of isolation. A virtual learning environment can offer a sense of communication and contact with other students and teaching staff through a community forum, a space for debates and a classroom forum. Yet, experience has shown that students' motivation level to learning and to participation in global common activities can still be very low, and thus they need a considerable amount of support to their studies. Often, students have the feeling that global spaces provoke diversion and they do not focus on handling their particular problems effectively. This can diminish their desire for learning. For this reason, they need a more intimate space where they can share their knowledge, ideas, worries and difficulties with a small number of classmates who join this space having the same objectives.

From this point of view, collaborative work in small groups could be considered as a strategic tool to improve the study conditions and the quality of the learning context. In addition, collaborative work can be an important element of motivation and support for the challenges students face during their university studies. In a broad sense, through a process of collaboration, students are given the chance not only to discover a new way of learning and working together in a virtual environment but also to construct social interactions and establish human collaboration networks for the rest of their studies.

In this particular scenario, our research focuses on designing a methodological approach that aims to support and enhance active learning through collaboration in a virtual environment. To that end, first, section 2 describes our research method, and summarises the results of a preliminary study. The next section discusses the pedagogical issues and methodology design applied to a real situation. Section 4 presents an initial analysis of the experimental results and the obtained benefits. Finally, section 5 discusses the basic implications of the study, and sets the stage for the next phase of this research.

2. Research Method

The main goal of our research is to investigate how collaboration can facilitate and encourage learning and social interaction among distance learning students in a virtual learning environment. On the one hand, traditional research on cooperative learning focuses on the questions how different group structures, labour division, and collective incentives can optimally improve speed and quantity of learning (Slavin 1995). On the other hand, the emerging research on Computer-Supported Collaborative Learning (CSCL) involves the mutual engagement of participants in coordinated efforts to build new knowledge and to solve problems together (Dilenbourg, et al., 1996). In fact, some recent research approaches examine the conditions under which effective collaborative knowledge building is achieved (Baker, et al. 1999). Yet the omission of social interaction in computer-based learning environments has been a particularly worrying issue (Baker 1985; Cuban 1986). Nowadays, however, this situation tends to change since recent research on CSCL is exploring the ways technology can facilitate social interaction (Lehtinen, et al., 1998).

Despite the growing practice around social learning both in research and in pedagogy, we are still rather ignorant about the processes involved in social learning, particularly, in virtual collaborative learning and shared knowledge building. In fact, we need theoretically well-grounded development of collaborative learning practices and tools that can be adequately embedded in a more global virtual educational environment. Although there exist a few well developed pedagogical models for CSCL (Cognition and Technology Group at Vanderbilt U., 1997) and networked learning environments that support collaboration (Koenemann, et al., 1999), it is not still studied how different practices and networked learning environments can fit in different virtual learning community needs and cultures, and support social learning and different group structures and styles.

To face this challenge, we designed, developed, analysed and evaluated authentic collaborative pedagogical practices within a virtual learning environment. In particular, we followed a theory/model-based approach which consisted of first apprehending the problem with a "theorisation" of the application domain for understanding cooperative work and learning in a virtual environment. This initial model was based on the concept of *communicative situations* (Marquès & Daradoumis, 1999). The next step of the approach consisted of running a preliminary experiment in a distance education course to test how our initial model could be used to support a cooperative problem-solving situation carried out by small virtual groups of students.

The outcomes of this study shed light on several important issues, such as the factors that influence virtual group formation, the characteristics of effective learning teams as regards the learning process followed, the group dynamics (communication, interaction, group organisation and cohesion), and the students and tutor roles. In addition, we drew interesting insights about the management and building of shared knowledge, the software products that supported collaboration and the principles used for the individual and group assessment.

After the preliminary studies, our theoretical framework to virtual collaborative learning was modified to account for the observed outcomes and to explore new ways of virtual collaborative learning. In particular, we initiated a new pedagogical practice with a virtual class of 32 students divided in small virtual groups of three to four students. Our objective was to promote a new way of studying and learning the contents of the computer-science course, "Information Structure", based on the realisation of collaborative learning activities through the BSCW shared workspace system (http://www.gmd.gd/bscw), a web-based groupware tool for asynchronous and synchronous cooperation (Bentley, et al., 1997). We call this new learning structure *Virtual Study Group (VSG)*, and we explain it in more detail in the next section.

3. Virtual Study Groups: Design and Pedagogy Issues

This section provides a critical examination and analysis of the design and pedagogy issues arising from applying a collaborative learning methodology to the BSCW virtual shared workspace. The key design issues concern the conceptualisation, planning and setting up of a networked learning structure, called Virtual Study Group (VSG), which can be arranged to support different collaborative learning experiences according to the specific way a learning group is organised (i.e., depending on the learning objectives and styles specified).

Our conceptual model of VSGs integrates both synchronous and asynchronous communication, though at the present collaboration is mainly based on the later due to the characteristics of our distance learning students. Its organisational structure is planned in three consecutive layers: *initiating, forming* and *performing*. All the three layers are set up on the BSCW networked collaborative environment which allows easy interaction between students on shared workspaces.

The first layer serves to initiate the students into the new experience and get to know each other. The second is used to carry out the rather complex task of group formation and organisation and thus establish an accepted group normative. A learning group is formed and organised in a variety of ways depending on the following key elements: individual and group goals which are related to the types of learning task to be realised; the cohesion level of the group, that is, the commitment (strong or weak) and involvement (active, passive or variable) level of the group members; the communication mode (synchronous, asynchronous) and the type of interaction (explanation, argumentation, negotiation) that can take place among the group members; the tutor's involvement level and particular roles, as well as the students' specific roles and attitudes; the number of participants who join the group; the members' specific characteristics, beliefs, needs and desires; the appropriate combination of different technologies that provide comprehensive support to communication, interaction and collaborative learning activities. Under these circumstances, different collaborative settings are proposed and established for acting at the third layer.

The third layer is where the actual collaborative study and learning of the subject matter is performed by the different learning groups. At this stage of collaboration, two key related factors have to be taken into account. First, we consider the working methodology followed by a group to carry out a learning task/activity at two levels, the discourse and action level. At the discourse level, the essential element is the interaction among peers (participants need to interact with each other to plan an activity, distribute tasks, explain, clarify, give information and opinions, elicit information, evaluate and contribute to the resolution of problematic issues, and so on). At the action level, task objects (e.g., documents, graphics) are created and manipulated.

Second, we need to keep track of how learning evolves and knowledge is built as well as how the learning process is affected by the following factors: the type of interaction (contributions) made, the type of cognitive and social actions performed, the social dynamics, roles and interrelations developed among the group members, as well as the role the tutor has to take in supervising and guiding the learning-process of the students.

Moreover, for effective collaborative learning to occur, both actions and interactions need to be well organised in the shared workspace of the group. In particular, on the one hand, we need to provide the means for the management and structure of the student interactions; on the other hand, we should care for the efficient organisation and management of the information and knowledge produced when interactions and collaborative or individual actions take place.

In this context, two other important issues complete and influence our collaborative setting and determine the ways collaborative study and learning is focused and performed. The first concerns the technological and training supports both on the technology and the methodology to be used for collaboration. The kind of support offered depends on the type of collaborative learning activities, the individual and group goals, the characteristics and commitment level of the learning group, and the interaction type. The purpose of providing this support is to help, direct and motivate the students to participate, and clarify the objectives and perspectives related to this experience.

The second issue concerns the evaluation policy and reward that students can obtain for being engaged in collaborative activities. In the current pedagogical practice, since participation in learning groups was optional, there was no formal evaluation of the work done. Thus, more emphasis was given on designing learning activities that could offer the students a reward materialised through shared knowledge-building and development of critical thought and reflection about their learning process. This fact proved to be a crucial help when students resolved individual assignments and final exams. In fact, our approach to relating and integrating collaborative learning activities with individual ones had beneficial effects for the students involved in group-learning.

Finally, several questions arise further methodology and research design issues. For instance: First, how do different learning styles affect group composition, the learning process, group interaction and cohesion, the task planning and working methodology, and the learning outcomes? Second, what kind of techniques can be used to provide effective measurement of student success? And, third, is it possible to map learner outcomes and achievement? How is the effort made related to successful outcomes? Is always effort accompanied by successful outcomes?

4. Benefits of collaborative study and learning

At this stage of research, our approach to networked collaborative learning aimed to support and promote effective and efficient learning in a distance education course. Apparently, VSGs constitute a very important shift from self-studying and learning of a conventional distance education system. Yet their integration to virtual universities/learning environments contributes to extend the options and possibilities of virtual classroom forums (where the whole class can interact and share information asynchronously). Indeed, the current pedagogical practice, developed and performed in our virtual campus, indicates that there is often much to be gained by arranging for distance students to collaborate in small virtual groups to achieve a common goal than just offering them a virtual shared space for the whole class. This new form of studying and learning suggests new expectations and benefits for both the students and tutors involved. As regards the students, we distinguished two main benefits.

First, collaborative learning creates the potential for cognitive and metacognitive benefits. On the one hand, it reinforces and improves the study and learning of the subject-matter contents. On the other hand, it engages students in a situation that requires them to make explicit both the process followed to carry out a learning activity and the strategies applied to resolve a problem. Making these facts available to everybody in the group can give rise to further discussion and reflection about issues of the learning process itself.

Second, collaborative learning promotes affective and social benefits in distance education. In particular, it increases the student interest and value that gives to the subject matter. It also increases positive attitude and social interactions among students, which results very positive and enriching for students with different knowledge levels and others characteristics. Finally, students are given more opportunities to participate in the resolution of learning activities specifically planned for small groups rather than for the whole class; especially, shy students are more likely to feel comfortable expressing their ideas or doubts in these more intimate settings.

As regards the tutor, our analysis revealed two main effects on the teaching process, which suggests new forms of teaching and the need to encourage a new teaching approach in order to support this paradigm shift. First, pedagogically, it seems important that tutors should pay closer attention to the design and evaluation of learning tasks and activities which are well suited to a variety of collaborative formats and learning styles and can be normally carried out by small virtual groups of 3 to 6 students. Second, we need to clarify the role that the tutor has to take in supervising and guiding the learning-process of the learning groups. Making the learning process of a group explicit, the tutor can be aware of the students weak and strong points and thus be able to intervene in order to repair deficiencies and thus monitor the group more effectively, using different strategies according to the situation.

5. Conclusions and Future Trends

Based on our pilot experience, the implications of this approach on learning have been quite positive and, most importantly, very promising. Both the tutor and the students involved have experienced, mentally and in practice, an important shift from existing methods of networked teaching and learning to new emerging pedagogies and methodology/research design, based on constructionism and collaboration. For this reason, on the one hand, we need to further encourage and train both students and teachers to make them more ready to overcome their hesitations and thus increase their willingness to follow this shift. On the other hand, we have to keep on working to develop reliable, robust and effective approaches to networked collaborative learning that have clear cognitive and social benefits for all the participants.

To face these challenges, we conduct our research to pay closer attention to three different levels of analysis and design, namely theoretical, methodological and educational ones. Theoretically, it is necessary to elaborate a coherent conceptual framework for understanding cooperative work and collaborative learning, as well as to analyse reflections and perspectives about social interaction in learning and instruction.

Methodologically, we need to design and develop theory-driven CSCL methodologies and analytical tools which are adequately embedded in a practical educational context and which are capable to untangle social processes and conditions that promote learning.

Pedagogically, it seems important to focus more on the design and evaluation of *collaborative learning situations* and instructional support systems which give possibilities for authentic constructive and social learning.

We believe that only based on such a multi-dimensional perspective we will be really able to develop techniques and tools which contribute to our comprehension of collective learning and facilitate its process. This fact will also enable us to deepen our understanding about "collective knowledge" and how different dynamics of social working modes and structures affect learning and instruction.

References

Baker, C. (1985). The microcomputer and the curriculum. A critique. *Journal of Curriculum Studies*, 17, 449-451.

Baker, M., de Vries, E. and Lund, K. (1999). Designing Computer-Mediated Epistemic Interactions. In: *Proc. of the 9th International Conference on Artificial Intelligence in Education (AI-ED 99)*. Lajoie, S. P. and Vivet, M. (Eds). IOS Press, Le Mans, France, August, 139-146.

Bentley R., Horstmann T. and Trevor J. (1997). The World Wide Web as enabling technology for CSCW: The case of BSCW. *Computer-Supported Cooperative Work: Special issue on CSCW and the Web, Vol. 6*. Kluwer Academic Press.

Cognition and Technology Group at Vanderbilt U. (1997). The Jaspers Project: Lessons in curriculum, instruction, assessment, and professional development. Mahwah, NJ: Lawrence Erlbaum.

Cuban, L. (1986). *Teachers and machines.* New York: Teachers College Press.

Dilenbourg, P., Baker, M., Blaye, A. and O'Malley, C. (1996). The evolution of research on collaborative learning. In: *Learning and Human and Machines: Towards an Interdisciplinary Learning Science.* Reiman, P. and Spada, H. (Eds). Pergamon, Oxford, 189-211.

Koenemann, J., Carroll, J. M., Shaffer, C. A., Rosson, M.B. and Abrams, M. (1999). Designing Collaborative Applications for Classroom Use: The LiNC Project. In: *The Design of Children's Technology.* A. Druin (Ed). San Francisco: Morgan Kaufmann, Chapter 5, 99-119.

Lehtinen, E., Hakkarainen, K., Lipponen, L., Rahikainen, M. and Muukkonen, H. (1998). Computer supported collaborative learning: A review of research and development. CL-Net. A report for European Commission.

Marquès, J.M. and Daradoumis, T. (1999). An approach to model communicative situations for virtual cooperative learning. Presented in the CSCL'99 Workshop "Collaborative use of Representations: Analysing Learning Interactions". Stanford, California, USA, Dec. 11-15, 1999. http://lilt.ics.hawaii.edu/CSCL99/CollaborativeReps/Contributions/index.html

Slavin, R. (1995). *Cooperative learning: theory, research, and practice.* Needham Heights, MA: Allyn and Bacon, 2nd Edition.

On-line learning: frontiers in the creation of learning communities

Mike Davis & Kate Denning
Centre for Adult and Higher Education
University of Manchester

Introduction

The aim of this paper is to look at the social and learning dynamics of computer mediated communication in postgraduate education. The research was conducted within the tradition of ethnographic action research and draws upon insights from the theory and practice of Adult Education, and from Social Anthropology.

The objectives were:

- to identify what group characteristics were demonstrated during action science casework using web conferencing collaborative technology
- to look for evidence of these groups becoming learning communities.

Key to this paper are concepts of learning communities and collaborative learning. Learning communities are learning environments premised on people sharing a set of common issues or problems and having the desire to learn ways to address them. Different from traditional teaching and training, learning communities focus on the collaborative efforts of participants to build knowledge and develop skills through practice and to reflect on the knowledge they have constructed.

Technology is becoming an integral part of the collaborative work and learning effort in organisations, often creating virtual groups functioning across time and distance. Collaborative technologies such as groupware, provide a dynamic process to support people in sharing experience through dialogue, inquiry, and "mutual knowledge" creation for the construction of "shared resolutions" to ill-defined problems (Schön, 1995). This type of technology can help to translate virtual groups into virtual learning communities, offering both a means and a reason for sharing experiences, building and capturing group knowledge, and improving performance in a distance environment. Hiltz (1994) makes this point when she contrasts first and third generation distance learning:

> *Most distance learning has taken place using an individualistic or self-study strategy... However computer-mediated communication is especially well suited to collaborative or cooperative learning strategies.* (Hiltz, 1994: 24).

The purpose of this research is to explore the characteristics of learning communities in a virtual environment and identify the important elements that contribute to or hinder their development. Key figures in adult education such as Freire (1972), have suggested that students learn best when the learning environment is permeated with a sense of community. Whether community exists or not is a question that is being asked of the virtual classroom in a way that it has rarely been asked of the conventional classroom. But as Cook (1995) writes:

> *First, we do not know how often community actually develops in classrooms. The assumption that a sense of community exists among students in traditional classrooms may be false in many or even most classrooms.* (Cook, 1995: 36).

Solloway and Harris (1999) believed that they were more likely to achieve community by consciously keeping out of the discussion forum but communicating via email and phone. Their fear that students would use the instructor as a marker for pegging their own responses was well founded in the initial panic-ridden messages they received. They quote one doctoral student as writing:

> *If he doesn't get in the discussion, how will I know how he thinks? How will I know how to direct my answer to the big question or my journal responses to the readings? How will I know what he wants?* (no page number)

They go on to write:

> *As the semester progressed, the technical problems and student frustration diminished. We received fewer desperate communications and more that expressed elation* (no page number).

Evidence from previous studies in CMC (Davis, 1997; Davis & Holt, 1998) suggest that successful interchange may not arise spontaneously and its absence can contribute towards social isolation and a lack of participation. While there are models that suggest that remediation of this can be straightforward (Harasim, Hiltz, Teles, & Turoff, 1995) we are keen to identify appropriate facilitation strategies to maximise effective participation.

Solloway and Harris found that *"the threaded discussion platform proved to be unsatisfactory for promoting a sense of community on-line"* and go on to advise that a variety of ways of communicating is necessary. We have not found this to be so in our use of the groupware <facilitate.com>. We have created groups some of which have formed learning communities, some of which not; some of which have demonstrated collaborative learning, some co-operative learning and some individual learning; whilst others have demonstrated very little learning. Clearly in our experience the key factors are more complex than the type of communication forum provided.

Hiltz, describing the software they use, writes:

> *This assignment was carried out using the 'activity branch' software. In a response branch, each student must answer the question before being able to read the answer of others* (Hiltz, 1994: 59).

As we shall demonstrate below, this kind of structure may work counter to attempts at building a learning community. Whilst the focus is on making the individual learner work independently, then a scaffolding of ideas - students building upon one anothers' comments - is absent. Without scaffolding it seems unlikely that collaborative learning is actually happening or that a learning community will emerge.

The data for this study are the product of an on-line postgraduate course in adult education called *"Cross-cultural Perspectives on Reflective Technologies in Work-based Learning"* taught collaboratively by the Department of Adult Education, University of Georgia and the Centre for

Adult and Higher Education, University of Manchester. This course is based on the examination and interrogation of students' case studies using Action Science, *"the science of interpersonal communication"* (Argyris *et al*, 1985) Students take it in turns to present a case study in groups of five or six. The data are the verbatim on-line transcripts of the web conversations as they engaged in the action science casework. The use of <facilitate.com> web-conferencing software has enabled the researchers to act as participant observers, focusing on group behaviour and an analysis of participants' "talk" on-line as they work to understand actions and meaning created in the virtual context. The on-line work of each course has generated approximately 200 pages of transcripts for analysis using NUD*IST (Non-numerical Unstructured Data: Indexing, Searching and Theorising). Additional data from participant and facilitator observations, reflection papers, and course evaluations has served as supporting documentation.

Among the more obvious findings is that some groups are more successful than others and this paper is an exploration of the contrast between two extreme examples: *Group Three* from the 1997 data and *Windows* from 1998.

Findings

A quantitative analysis of the first case of each of the two groups under examination gives a stark account of some of the differences. The total number of interventions made into *Group Three* was 17 over the period of a week, and the total number into *Windows* was 198 including one late entry made outside the week's time limit. Within this the distribution of entries throws further light on what was happening in the two contrasting groups.

	Casewriter	Tutors	Remaining group members	Total
Group Three	2	4	11	17
Windows	79	7	112	198

Table 1 – Levels of activity in Group Three and Windows (Raw data)

Each of these figures can then be expressed as a percentage of the whole to see who is 'working' the most in the two groups.

	Casewriter	Tutors	Remaining group members	Total
Group Three	11.8	23.5	64.7	100
Windows	39.9	3.5	56.6	100

Table 2 – Levels of activity in Group Three and Windows (%)

An initial observation suggests that the casewriter and the tutors are particularly significant in the success of the group. The casewriter in *Group Three* did very little and there was therefore little for the group to work on. Action Science works by group members creating and following lines of enquiry. If group members receive no response to their questions and observations, they are unable to build a hypothesis about what might be going on. In this case, the fall in the level of activity by the casewriter has been mirrored by a rise in the level of activity by the tutor. This quantitative analysis, however, leaves many questions unanswered and even unasked.

BEST COPY AVAILABLE

Upon closer examination of the two groups there are a number of potentially significant differences in the content of the messages the participants sent to each other. A qualitative analysis provides a more useful indication as to the likelihood of a group becoming a learning community.

From our previous work we have highlighted a number of conditions which we believe are necessary for the formation of a learning community and several which we believe hinder. This is based on analysing the data from eight groups over a period of three years although in this paper we are concentrating on two groups.

Key criteria likely to promote the formation of a learning community, are as follows:

- risk-taking/experimenting - pushing the boundaries of what is acceptable
- challenging/facing rather than avoiding conflict
- building or scaffolding of ideas
- social activity
- humour
- metacommunication/reflecting on the process
- expressing interest
- feedback/disclosure

In contrast, criteria likely to inhibit the formation of a learning community:

- accepting without question
- denial
- passifying - avoiding rather than facing conflict
- closing down inquiry
- lack of interest
- lack of social activity
- working independently

The above list of conditions necessary for the formation of a learning community fall broadly into two categories which we have described as attention to group dynamics and attention to learning dynamics.

Group Dynamics	**Learning Dynamics**
risk-taking	building or scaffolding of ideas
facing rather than avoiding conflict	challenging
social activity	experimenting
humour	metacommunication?
expressing interest	reflecting on the process?
reflecting on the process?	
feedback/disclosure	

Table 3 Some characteristics of group and learning dynamics

Both of these sets of criteria have encouraged us to focus on six conceptual areas of consideration:

1. Social organisation – the extent to which people relate to one another

BEST COPY AVAILABLE

2. Type of learning – along the continuum from individual through co-operative to collaborative
3. Orientation towards task and/or tutor – the response of individuals and group towards the work of the group and the tutor's role in encouraging learning
4. Bion's model of group work – Bion depicted two modes: *basic assumption*, in which a group is avoiding work, and sophisticated, which he came to call *Work*. Basic assumptions include flight/fight (BA *f*) pairing (BA *p*) and dependency (BA *d*) (Bion, 1961)
5. Emotional climate – the dominant emotional response to the task and the working of the group
6. Group strategy – response to challenge.

In considering these conceptual areas, it occurred to us that we could combine them in a grid – see Table 4 on the following page. We have plotted four possible responses on the grid and in each case, have identified the extent to which group members perform in relation to the above areas, as follows.

Fragmented by technologies (1,1) A group which is low on both learning and group dynamics may have very little activity and will not be concerned about the group processes nor will it be effective in its learning objectives. Members will be isolated from one another and their approach to learning, where it exists, is individual. Socially, they are isolated and their basic assumption is *flight* – from the task and any discussion about the task. This leads to public indifference (but there are email messages that indicate private frustration and anger) and a group strategy of passive resistance. This is all well summed up by a casewriter in group Three who commented on his own case as follows:

> Jack: *i (sic) have reviewed your input, and appreciated your interest. the questions that were asked will help me focus on the situation.*

As indicated in Table 1, this represents 50% of this case-writer's output and clearly the experience has made little positive impact on the him and the rest of the group. The condition of anomie is described as:

> *A condition in which the members of a superficially well organised society feel disconnected and isolated, resulting from an excessively specialised social structure which limits closeness and intimacy. (Reber, 1988: 38)*

and this seems to accurately describe aspects of the life of this group at this particular time.

Summer Holiday (1,9) If a group is high on group dynamics but low on learning dynamics then it might be where the group have fun but achieve little learning. Here, members are displaced from normal life and they demonstrate self interest and individuality. Work is avoided and the complex notion of BA*p* is acted out. In this, the group waits for a magical event to emerge from possible pairing of other participants. Accordingly, they can be high on social interaction – often manifested through social conversation at the expense of work, for example:

> Sally: *Hello group from Univ of London - it's cool and beautiful here. I too feel refreshed after a couple of days of sleep before coming over.*

Indeed, the social is the dominant theme in this type of group and this, of course, can be very satisfying for the members.

I'm ok, you're ok (9.1) If a group is high on learning dynamics but low on group dynamics then members will show little concern for each other personally and will tend to work independently rather than interdependently. They will, however, be acting co-operatively but this has to be distinguished from collaboration. In the latter, understanding and insight grow from the social construction of knowledge. In the former, it is more competitive and individual understanding and insight is the desired outcome. Compare the following:

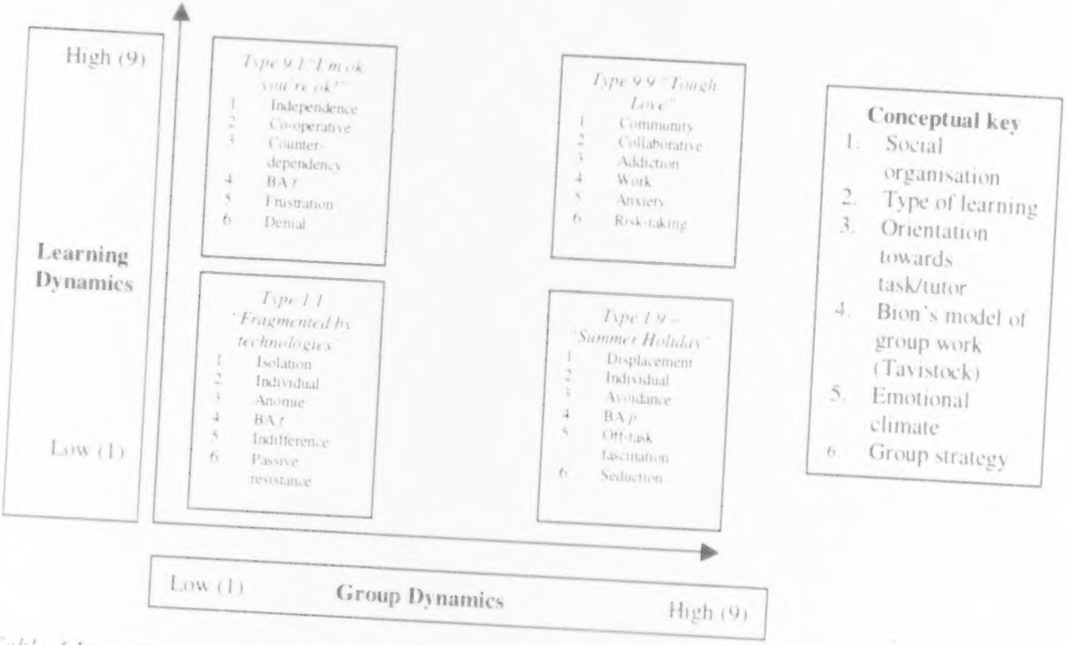

High (9)
Learning Dynamics
Low (1)
Type 9.1 "I'm ok you're ok!"
1 Independence
2 Co-operative
3 Counter-dependency
4 BA f
5 Frustration
6 Denial
Type 9.9 "Tough Love"
1 Community
2 Collaborative
3 Addiction
4 Work
5 Anxiety
6 Risk-taking
Type 1.1 "Fragmented by technologies"
1 Isolation
2 Individual
3 Anomie
4 BA f
5 Indifference
6 Passive resistance
Type 1.9 – "Summer Holiday"
1 Displacement
2 Individual
3 Avoidance
4 BA p
5 Off-task fascination
6 Seduction
Conceptual key
1. Social organisation
2. Type of learning
3. Orientation towards task/tutor
4. Bion's model of group work (Tavistock)
5. Emotional climate
6. Group strategy
Low (1)
Group Dynamics
High (9)

Table 4 Learning community grid

> Kath: *I find Katrina has made an intervention that has set me thinking...*
> Janet: *Just to tag on to Kath's response...*
> Martin: *Good job Kath you've hit a big problem on the head ... maybe one solution is ...*

with:

> Janis: *It is a little challenging to offer a ladder of inference wihtout (sic) some feedback from you, Jack*

Inevitably, groups who find themselves in this situation demonstrate counter-dependent behaviour with frequent (although invariably unsuccessful) appeals to authority to deal with the uncertain group dynamics. Equally inevitably, tutors are held responsible for their failure to make the groups work more effectively and members deny their collective and individual responsibilities for the difficulties the group is experiencing.

Tough Love (9.9) Groups who manage both group dynamics and learning dynamics get as close as is possible to being a learning community. They behave in a collaborative manner, in particular in checking out assumptions and perceptions with other group members, e.g.

BEST COPY AVAILABLE

> Kath: *I'm going to be really mean now Rowena and assume that "Ooh that's harsh" means I hit the nail on the head there. Is my assumption correct?*

The work of the group takes on an incredible pace and volume: students report logging in at all times of the day and night and many independently have talked of how addictive the process is, e.g.

> Janet: *I agree about this becoming somewhat addictive. I find myself wanting to checking [sic] several times daily.*

The consequence of volume and intensity is that considerable insight is developed into the interpersonal processes under exploration through the action science cases. Action Science as an organisational intervention is very powerful but it can raise high levels of anxiety given that the design is to explore participants' interpersonal incompetence. Invariably people act out the characteristics of their case during interrogation, and that makes necessary risk-taking, as in these examples:

> Teresa: *Rowena is there any way that D was directing her original statement/question to the coach or someone else (and not at you) and she percieved (sic) your comments as being pushy, or Rowena being a "know-it-all" etc*
>
> Kath: *Here goes. I feel a bit scared at stepping into this one first so feedback would be helpful for me.*

The combination of these characteristics are what lead us to believe that learning communities of great value can be created on-line. While it is an ideal type, we have seen groups spend considerable periods in this modality, be capable of falling out of it and returning to it when conditions have been adjusted. Bion's model is helpful here. He argued that a group could either function in *work* mode or in *basic assumption* and we believe the same of groups in cyberspace.

Conclusion

However, as yet there is no clarity as to how one group is successful and another is less so and that is the matter for our further research. What is clear to us, however, is that the on-line world can be a powerful learning environment that demands effective and challenging facilitation, with its attendant risks, as this email might imply:

> *Kate today was great... In particular your comments, they really made me think. I have written this in the case for the rest to read, but I shall give you more detail.*
>
> *For many years I rock climbed and I remember the feeling of being scared witless on many occasions ... I loved it - that was part of the challenge. And today the thought of something hidden that suppressed my emotions also scared me a bit.. The uncomfortable feeling I could compare with being scared during rock climbing.. I know it sounds stupid, but that's how it felt. [...]*
>
> *I also would like you to know that it raises my hackles when you & Mike [...] challenge what I do feel and think and make me question how I behave and act.*

> *This may be old hat to you, but for some one my age and "grooming" it is all new "territory" to me.* (email correspondence March, 2000)

Bibliography

Argyris, C., Putnam, R. & Smith, D. (1985). **Action Science**. San Francisco: Jossey-Bass

Bion, W. (1961), **Experiences in Groups and other Papers**. London: Tavistock

Cook, D. (1995), *Community and computer-generated distance learning environments*, **New Directions for Adult and Continuing Education**, 67, 33-39

Davis, M. (1997): *Fragmented by technologies: a community in cyberspace*, **Interpersonal Computing and Technology: An Electronic Journal for the 21st Century**, [On-line] 4, 2, 8-17 Available: http://www.helsinki.fi/science/optek/ [Retrieved 1997 September]

Davis M. & Holt, M. (1998), *havingproblems@cm.com: new ways to miss the point.* **Innovative Higher Education** 22, 4, pp311-327

Freire, P. (1972). **Pedagogy of the Oppressed**. Harmondsworth: Penguin

Harasim, L.; Hiltz, S. R.; Teles, L. & Turoff, M. (1995). **Learning Networks: a field guide to teaching and learning on-line**. Cambridge, USA: MIT

Hiltz, S. R. (1994). **The Virtual Classroom: learning without limits via computer networks**. New Jersey: Ablex

Luft, J. (1970). **Group Processes: an introduction to group dynamics** (Second edition) Palo Alto, Ca: Mayfield

Milton, J., Davis, M. & Watkins, K. (1999). *Virtual learning communities: creating meaning through dialogue and inquiry in cyberspace.* **Proceedings of Academy of Human Resource Development Conference**. Arlington, Va, USA

Reber, A. (1985). **The Penguin Dictionary of Psychology**. Harmondsworth: Penguin

Schön, D. (1995): *The new scholarship requires a new epistemology: knowing in action.* **Change**, 27, 6 pp26-39

Solloway, S. & Harris, E. (1999), *Creating community on-line*, **Educom Review** [On-line] 34, 2 pp8 - 13 Available Http://www.educause.edu/pub/er/erm99/erm9902toc.html [Retrieved] 16 May 1999

Whipple, W. (1987), *Collaborative learning: recognizing it when we see it*, **Bulletin of the American Association for Higher Education** 40, 2 pp3-7

Student approaches to networked learning and the role of evaluation

Gabi Diercks-O'Brien, Terence Karran, University of Lincolnshire and Humberside

The objectives of this paper are to discuss the role of evaluation in helping to understand networked learning better and to contribute towards constructing a new paradigm for this new and unexplored mode of learning. Moreover, the preliminary findings of the large-scale evaluation of networked learning, as part of the Teaching and Learning Technology Programme TLTP3 funded Extended Learning Environment Network (ELEN) Project, will be presented here.

The ELEN project involves eight HE institutions and integrates electronic key skills and subject resources in the curriculum through the use of a networked learning environment, the *Virtual Campus*. The ELEN project is evaluating the integration of networked learning into the curriculum from the point of view of students and academic staff. Significant resources have been allocated to enable a comparative evaluation to be undertaken across the eight institutions and individual projects. The ELEN project team views the evaluation as an opportunity to make universally applicable statements about perceptions of networked learning, reusability of resources, and the nature of integration. Within these broad themes, the evaluation focuses on support, feedback and monitoring systems which are believed to be *the* vital link between classroom and open learning:

> A fully developed learning support system would allow a very high degree of self-paced, exploratory learning and research will be required to identify those features of the environment which best support learning [...] Teachers will be involved increasingly in the support, development and management of learning environments. The organisational implications of this shift are very great. (MacFarlane Report, CSUP 1992)[1]

The ELEN evaluation of the learning experience has its roots in the student-centred learning approach at the University of Lincolnshire and Humberside:

> Learning to learn will help students manage their own learning. It will also develop students as independent and lifelong learners by making effective use of their own time, tutors and other support staff, learning materials and technology. (Ford et al. 1996)[2]

Dynamic and interactive learning environments which demand learner independence and autonomy, need to be flexible as regards learning styles and learning routes. Moreover, a systematic approach to support, feedback and monitoring is needed, more particularly for passive learners for whom learner autonomy and independence may be problematic. The concept of the autonomous learner who actively engage with the learning environment to construct knowledge underlies the philosophy of the ELEN Project and its perception of the learning experience. This understanding is underpinned by the MacFarlane Report (CSUP 1992)[3], the Learning Environment Architecture Model (Ford et al. 1996)[4], the work of the Open Learning Foundation and publications by ULH's Educational Development Unit (e.g. Lewis & Merton 1996)[5]

The ELEN approach to evaluation of the learning experience

Designing an evaluation framework for a new kind of learning experience proved problematic because it is difficult to determine which evaluation criteria are appropriate to a new and unexplored mode of learning. An evaluation framework had to be constructed that would address:

- the complexity of the learning experience -the approach has to be holistic;

- the need to contribute to the understanding of a new mode of learning;
- the identification of changes in the infrastructures of support, feedback and monitoring systems following the introduction of technology into learning;
- the limitations of previous localised and context-bound evaluations of learning which fail to investigate the "learning infrastructures" needed to support networked learning environments. A comparative and empirical evaluation across different contexts is needed to identify these infrastructures.

The ELEN project shares the holistic view of the learning environment advocated by the MacFarlane report:

> Not only does an individual course provide a specific learning environment created by the course designer, but each department and institution has policies and practices which add further components. We have to consider this extended learning environment as a complex interacting system. [...] Effective change will depend on analysing the system, identifying problems and weaknesses, and then negotiating the types of change which are most likely to create the required improvements in outcome. (CSUP 1992)[6]

This holistic view has been reflected in the learning environment model developed for the ELEN evaluation:

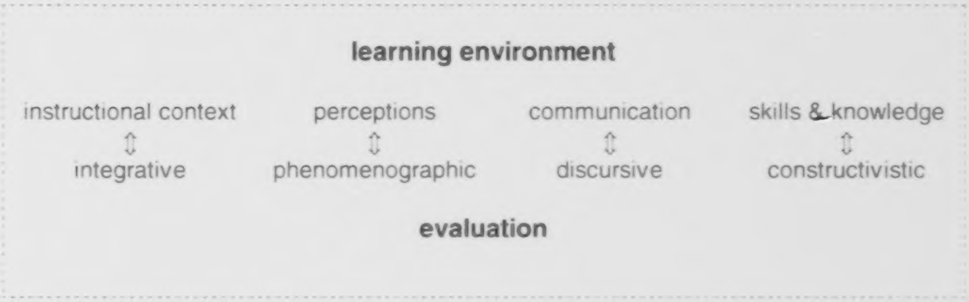


Figure 1 *The learning environment evaluation model*

This model, which has been detailed by the ELEN project team (Diercks-O'Brien 2000)[7], reflects the complexity of learning and is truly holistic. Four main domains have been identified and each has a corresponding approach to evaluation. Research into learning has identified these four domains and the corresponding approaches to evaluation but has not been able to integrate them into one single model of evaluation of learning.

Successful integration of networked learning depends on the dynamics within and between the various elements of the model and the degree of learner interactivity. Evaluations tend to focus either on the implementation process, which investigates institutional cultures and infrastructures to identify opportunities for, and barriers against, technology implementation; (Alexander *et al* 1998)[8] or integrative evaluation, which investigates the learning context in the light of effective integration of technology in the classroom, but without consideration for support systems outside the classroom boundaries. (Draper *et al.* 1996)[9] Integrative evaluation, as perceived within the ELEN project, extends beyond the classroom. Evaluation further needs to investigate the learning infrastructures available to support increased learner independence, such as feedback, monitoring and support systems. Kember states that "approaches to learning are direct descriptions of learning processes used by students" and they are "sensitive to the various contextual variables which constitute the teaching and learning environment." (Kember 1997)[10] It becomes increasingly important to investigate how, when and where knowledge is constructed in a multiple media, resource-based and learner-centred learning environment. Hence the focus of the investigations should be on learner interaction with knowledge chunks because "knowledge is not a fixed commodity, but a function of our interactions with external resources including tools, media, other humans." (Ryder & Wilson 1997)[11]

The ELEN project has adopted the model for its empirical investigation into the networked learning experience. For the purpose of this paper the focus will be on the instructional context domain and the skills & knowledge domain of the model.

Preliminary ELEN evaluation findings

For the first part of the evaluation, Level 1 students were sent questionnaires which focused on the following areas:

- appraisals of the importance of specific skills,
- perceptions of what kind of learner they are;
- expectations of tutorial support;
- usual source of support when faced with difficulties;
- importance of IT skills for study and for work
- confidence in using IT
- personal information - gender, age, ethnicity

In addition to closed questions, students also had a series of open ended questions addressing, inter alia, why they believe IT skills are important. Currently 679 completed surveys have been returned from three of the universities in the project. The sample size means that there should be a high level of reliability for the results. It is inappropriate to report all statistics here, and this analysis will examine some initial findings and indicate possible connections of interest. For most questions within the survey, students were asked to provide responses on a six point scale ranging from, for example, "Very Confident" to "Not at all Confident". For the purposes of succinct exposition, the percentage scores for the highest and lowest categories are used in this paper. Similarly, to try to tease on any cultural differences between the different ethnic groups, the students from the India sub-continent were grouped together. Tables 1 gives a breakdown of the sample in respect of gender and ethnicity.

Table 1: Sample by Ethnicity and Gender.

	All %	Male %	Female %
White	19	55	45
Black Caribbean	3	44	56
Black African	12	44	56
Black Other	2	50	50
Chinese	6	47	53
Indian	30	45	55
Bangladeshi	3	56	44
Pakistani	9	59	41
Other Asian	6	46	54
Other	6	32	68
Prefer not to answer	4	64	36
All		51	49

Table 1 shows that the sample is split nearly exactly by gender, (49% male, 51% female). In terms of ethnicity, the table shows that the dominant ethnic group is from the Indian sub-continent - students from India, Bangladesh, and Pakistan make up 42% of the sample, with those designating themselves as "White" as the second largest group. Splitting the group by gender and ethnic background shows that the Indian female group is clearly the largest.

The first question examined students' perceptions of the value of particular skill areas to themselves. As Table 2 shows IT skills are considered the most important skill area - over 70% see these skills as "very important", this is closely followed by Communication Skills at 68%. In contrast to these new skills, which are very much a part of the knowledge economy, the traditional skills (the three Rs) of writing and arithmetic figure comparatively low - only half the students thought that numeracy was very important. In terms of gender difference, in every instance, the females tended to regard these skills as being more important than their male equivalents. Interestingly, the white ethnic group regarded IT and communication skills as less important than did the other ethnic groups, for example 76% of the Asian group saw IT skills them as very important, compared with 53% for the white group.

Table 2 : Importance of Skill Areas.

	All		Male		Female		White		Asian	
	Very High %	Very Low %	Very High %	Very Low %	Very High %	Very Low %	Very High %	Very Low %	Very High %	Very Low %
IT skills	72	1	69	2	74	0	53	2	76	1
Communication Skills	68	0	64	1	72	0	60	0	70	1
Independent study skills	66	1	59	1	72	1	55	0	65	1
Finding/using information	63	0	61	1	65	1	62	0	61	1
Presentation Skills	63	1	57	1	68	0	56	1	62	1
Writing skills	61	1	57	1	64	1	52	0	59	1
Working in a group	59	1	58	1	58	1	52	1	58	1
Numeracy	52	1	46	2	58	0	41	1	55	0

The second question looked at students perceptions of their own learning attributes. The results in Table 3 show students perceive themselves as open minded, patient and enjoying group work - although students consider themselves as patient, paradoxically they dislike routine work. There appear to be few gender differences, although males seem less likely to enjoy routine work. On all the learning attributes described, the "white" ethnic group has lower scores - for example 16% of the white cohort see themselves as "Thoughtful Learners" compared with 25% for the Asian group, similarly the scores for the two groups on the liking of routine work are 9% and 18% respectively.

Table 3: Student Perceptions of Learning Attributes

	All		Male		Female		White		Asian	
	Agree %	Dis-agree %	Agree %	Dis-agree %	Agree %	Dis-agree %	Agree %	Dis-agree %	Agree %	Dis-agree %
Open Minded	33	1	34	0	34	1	26	2	29	0
Patient Person	30	3	28	2	31	3	22	3	30	2
Enjoy Group Work	30	2	32	1	30	2	25	2	33	2
Learn in logical way	30	0	29	0	30	0	23	0	27	0
Practical	28	1	29	0	28	1	26	0	27	0
Thoughtful Learner	25	0	25	0	25	0	16	0	25	0
Like Routine Work	16	4	13	5	18	4	9	6	18	3

Table 4 shows student expectations of tutor support. This table indicates that students attach most importance to tutors explaining concepts and providing guidance, but are less keen on tutors experimenting with learning, and on student discussion and more particularly on undertaking independent work. What is perhaps surprising is that students are less likely to expect tutors to provide lecture notes (and hence take a passive role in learning) and more inclined to expect tutors to provide guidance and explanation (which is more indicative of an active and participative ethos). For gender characteristics, the only difference appears in a greater inclination by the female cohort to expect tutor support in the form of guidance. In respect of ethnic background, in every one of the different roles described in the survey, the students from the Asian sub-continent had higher expectations of tutor support than those in the White ethnic group, the differences between the groups being most marked in respect of the provision of lecture notes where 57% of the Asian group agree strongly with the expectation of the Tutor as a provider of lecture notes, compared with 35% for the White ethnic group.

Table 4: Student Expectations of Tutor Support

	All		Male		Female		White		Asian	
	Agree	Dis-agree	Agree	Dis-agree	Agree	Dis-agree	Agree	Dis-agree	Agree	Dis-agree
	%	%	%	%	%	%	%	%	%	%
Explain topics	74	0	72	0	76	0	71	0	74	2
Provide guidance	61	0	53	0	70	0	54	0	57	3
Supply list materials	63	1	63	1	63	1	54	0	63	0
Provide lecture notes	53	1	50	2	55	1	35	0	57	2
Allow experiments	39	1	35	2	43	1	26	1	39	3
Emphasise discussion	37	1	39	1	34	0	26	1	35	4
Allow independence	19	2	20	2	19	1	14	2	19	2

In terms of seeking support, students see module tutors rather than learning support staff as the most important for help with subject questions. To address learning difficulties, students are likely to turn to Learning Support staff and also fellow students, but about a third of students still referred general learning difficulties to subject tutors. For IT problems, students generally refer to Computer Staff rather than other groups. There are few apparent gender differences, although female students are more likely to refer to the Module Tutor for subject questions, while male students are more likely to seek help from library and learning support staff. Students in the white ethnic group are generally more likely to seek help from the main support areas (Tutors, Library and Learning Support), than their asian counterparts. However, knowledge of english is not a barrier to seeking support - 86% of native english speakers asked their tutor for subject advice, compared to 82% for which English was the second language.

Table 5: Where do students seek help?

		Module Tutors	Fellow Students	Library Staff	Learning Support	Computer Support	Other Staff
		%	%	%	%	%	%
Subject Questions	All	83	45	33	23	8	3
	Male	83	44	38	26	9	3
	Female	85	47	29	18	6	1
	White	88	51	39	15	7	0
	Asian	80	45	29	22	5	3
Learning Difficulties	All	32	51	33	58	7	3
	Male	36	50	26	53	8	3
	Female	31	54	37	63	5	1
	White	44	53	29	63	5	2
	Asian	31	51	33	60	8	2
	All	16	24	23	16	80	2

IT Questions	Male	16	24	24	14	76	2
	Female	15	24	24	17	85	1
	White	18	32	28	21	83	0
	Asian	14	23	23	11	81	2

All students were convinced of the need for IT skills to help them to study and in their future careers, as table 6 shows. The gender differences are small, but it is interesting to note that the female group were more likely to see IT skills as important for study and career than their male counterparts. Similarly in respect of ethnic differences, the Asian cohort placed greater importance on IT skills than the white cohort.

Table 6: How Important are IT skills?

		Very Important %	Important %	Not Important %
IT Skills for Career	All	90	10	0
	Male	87	12	1
	Female	92	8	0
	White	83	14	3
	Asian	93	7	0
IT Skills for Studies	All	79	21	0
	Male	76	24	0
	Female	83	17	0
	White	68	32	3
	Asian	83	17	0

Students were also asked to state why they thought IT skills were important and the findings from the open questions can be divided into three categories:

- **Career:** students think that IT skills enhance their career prospects or are essential to obtain a job and make a career in an ever increasingly technological age.
- **Business, Work**: students think that businesses, organisations, and the workplace in general are increasingly dominated by technology and that effectiveness is increased through IT. Some believe that businesses will not be able to survive without computerisation and an IT-literate workforce.
- **Global issues:** the vast majority of students believe that computerisation is an inevitable fact and the most important element of present and future life: "Because computers are the future. Because everything involves computers." "The world is becoming increasingly IT based. If we don't learn how to grasp the concepts, we will fall a long way behind." The most surprising finding is that students seem to see computerisation as something that is beyond their powers to influence and there is a sense of doom and domination: "They are important because the general trend in the present society we live in dictates so, it is predominantly dominated by them."

Surprisingly few students from these cohorts have identified clearly positive reasons for becoming IT literate, such as effectiveness and efficiency, access to information and global communication, IT for learning. Most students clearly see themselves as instruments of computers, rather than themselves as agents who can manipulate computers and use them as a tool to achieve their aims. The task of educators will have to be to develop more positive notions about computers and IT skills

Table 7: Student Confidence in using well known IT programs

	All		Male		Female		White		Asian
Very	Very	Very	Very	Very	Very	Very	Very	Very	Very

	High %	Low %	High %	Low %	High %	Low %	High %	Low %	High %	Low %
Text Processor (Word)	58	4	57	4	59	4	42	5	65	3
Spreadsheets (Excel)	39	5	41	4	38	6	23	6	47	4
Email	38	7	41	5	35	9	24	9	42	5
Searching the WWW	34	8	46	5	24	10	27	12	37	6
University Intranet	24	9	32	6	16	12	15	13	27	8
PC/Mac Environments	24	9	28	7	19	12	20	9	25	7
Presentation (Powerpoint)	19	14	21	13	16	16	12	17	25	9
Database (Access)	15	19	16	16	13	23	6	26	16	14
Stats Package (SPSS)	5	27	6	22	3	34	3	32	5	21

Student confidence in using well-known IT packages varied considerable, most knew how to use Word and Excel and were confident with email. However, relatively few were acquainted with Powerpoint, Access and SPSS. In every instance, the males tended to be more confident in the use IT programs than the females, which provides some explanation for the greater tendency for the female cohort to seek help with IT, as reported in table 5. The White ethnic group generally were less confident with using the new technology - for example 15% of the White group were confident about accessing university information, compared to 39% for the Bangladeshi group, 38% for the Black African, and 27% for the Indian. Similarly in respect of using the Web, 27% of the White group were very confident, while the comparative figures for the Bangladeshi, Indian and Pakistani groups were 50%, 37% and 32%.

Conclusions

The first part of the evaluation has suggested useful areas for further study, and the next step is a more sophisticated data analysis to inform the collection of qualitative data through focus groups, and thus put some interpretative flesh over the bare bones revealed by the quantitative survey. An empirical and comparative evaluation will take evaluation out of the context-bound sphere and provide universally applicable statements about networked learning environments. These initial findings indicate for the instructional context and the skills & knowledge domains that:

- students want clear guidance from their tutors and their willingness to work independently needs to be properly supported;
- students need clear information about the type of support they can expect from staff – thinking that computer staff can support computer-assisted learning can be problematic;
- even a unsophisticated preliminary analysis demonstrates indicative perceptual differences between student cohorts, in respect of their experience of using technology in learning.

The intended outcome of the ELEN evaluation of the learning experience is to identify the supportive contexts for, and effective approaches to networked learning, and thus to contribute towards the definition of a new paradigm.

---

[1] Committee of Scottish University Principals [CSUP] (1992). *Teaching and Learning in an Expanding Higher Education System.* ('The MacFarlane Report'). Edinburgh: SCFC, pp. 30-31.

[2] Ford, P., Goodyear, P., Heseltine, R., Lewis, R., Darby, J., Graves, J., Satorius, P. Harwood, D. & King, T. (1996). *Managing Change in Higher Education. A Learning Environment Architecture.* SRHE & OU: Buckingham, p. 77.

[3] CSUP 1992, *op.cit.*

[4] Ford *et al.* 1996, op. cit., pp. 51-63.

---

[5] Lewis, R. and Merton B. (1996) *Technology for Learning: where we are going. A Position Paper.* Learning Development, University of Lincolnshire and Humberside.

[6] Ibid., 59-60. A conceptual map of a conceptual map of the teaching-learning system in Higher Education is available on these pages.

[7] Diercks-O'Brien, G. (2000). *Approaches to evaluation of networked learning.* Centre for Access and Lifelong Learning, University of Lincolnshire and Humberside (unpublished paper).

[8] Alexander S., McKenzie J. & Geissinger, H. (1998). *An Evaluation of Information Technology Projects for University Learning.* University of Canberra.

[9] Draper, S., Brown, M., Henderson, F. & McAteer, E. (1996). Integrative evaluation: an emerging role for classroom studies of CAL. *Computers in Education 26*, pp. 17-32.

[10] Kember, D., Charlesworth, M., Davies, H., McKay, J. & Stott, V. (1997). Evaluating the effectiveness of educational innovations: using the study process questionnaire to show that meaningful learning occurs. *Studies in Educational Evaluation 23*, 2, pp. 144-145.

[11] Ryder, M., Wilson, B. (1997) *From Center to Periphery: Shifting Agency in Complex Technical Learning Environments.* Paper presented at the meeting of the American Educational Research Association, March 27, 1997, Chicago. [http://www.cudenver.edu/~mryder/coss.html]

Introducing Networked Learning with Human Resource Development Professionals Internationally

CATHERINE EDWARDS
Department of Continuing Education, University of Warwick
Catherine.Edwards@warwick.ac.uk

Introduction

This paper offers an analytic and reflective discussion based on data from longitudinal action research in to the curriculum development of a postgraduate course for human resource development professionals. Earlier work discussed the introduction of email discussion into this distance learning programme to enhance dialogic learning (Edwards and Hammond, 1998). Course team discussion, staff development and further research with students arising from this study led to the design of a course intranet. The purpose of the intranet was to offer a forum for students world-wide to share information and perspectives related to their learning and their professional practice. The paper explores issues raised in the preparatory stages of this development, about the potential of networked learning, especially in relation to our aspirations to enhance collaboration between learners (McConnell, 1998). It discusses the value of discovering and acknowledging the different interpretations of learning networks and networked learning held by and shared amongst students from diverse cultures who were preparing to use this new technology for trans-cultural communication and learning.

Data was gathered through focus groups, recorded group work, questionnaires and some monitoring of email discussion usage and content. Students were based in UK, Ireland, and Singapore and included those working in Africa, Hong Kong, the Caribbean, and a number of European countries. At various stages the rationale for the research and curriculum developments was negotiated with participants and their co-operation solicited in identifying and responding to key questions and issues.

The paper begins with an overview of how developments unfolded over a three-year period. It required a considerable amount of time and tenacity to initiate and sustain technological innovation within an existing curriculum and mode of provision. Issues in the debate around collaborative versus individuated and competitive learning cultures are drawn out as the story of the case study unfolds. The paper suggests that new technologies can offer new opportunities for those aspiring to provide and model collaborative learning. But it also offers two particular notes of caution. The first is that the technology itself does not automatically engender collaboration, it 'merely' facilitates it, perhaps more quickly in some respects, where negotiated. And the second is that collaborative learning is itself a problematic and differentially understood and experienced concept which is worthy of deconstruction before being whole-heartedly and uncritically embraced. Issues around the preparation of international participants for trans-cultural communications and learning are also discussed.

Collaborative networked learning: aspirations and dilemmas

The concern to develop further collaborative networked learning opportunities for students on this programme came originally from students. They variously expressed interest in pursuing debates and intellectual argument further than seemed to be possible within the time constraints of the limited face to face learning phases of the course. Networked communication through, in the first instance, email discussion forums, appeared to offer a technology for this. But early attempts resulted in low levels of participation for a variety of reasons. These included issues of computer literacy, lack of easy access to email or a computer, and maybe above all, intellectual tentativeness and lack of general experience of regular academic discourse. (Edwards and Hammond, 1998). Some students said they felt email discussion around serious academic themes would be easier for them than face to face debate because they could write at their own pace and would not be intimidated by more vocal class members. Others felt the opposite, that their partially developed ideas in text formed a permanent record of their intellectual insecurity and 'incompetence'. All agreed that the concept of collaboration was problematic both in its interpretation and in its implementation. And all expressed strong interest in networked learning becoming an integral part of course teaching and learning practice, despite problems experienced due to access and some scepticism regarding its putative learning potential.

In pursuit of a negotiated understanding of how we might use the technology to learn collaboratively, course tutors and students explored how we already used the terms network, networking, networked learning and learning networks. We asked each other to think about, draw, write about and then discuss how we 'saw' networks and how, if at all, we already used networks to help us to learn (as opposed to helping us to socialise or make useful professional and life contacts). We used Seed's (1990) framework of network features, network types and networked relationship qualities, drawn from social work, literature to refine and compare the emerging models. This exercise was conducted on three different occasions over two months in UK, Ireland and in Singapore. It enabled us to learn the similarities and differences in each others experiences, uses of language, models, to think more deeply about what contributed to our own learning and to hear and take account of a broadening perspective on the experiences of others. By also making transparent our views across the course team of twenty or so tutors we hoped to model an 'honest as possible' insight into the dilemmas and concerns that aspirations of collaborative learning entails. Above all we began to take much more detailed note of constraints and limitations in order to either overcome them or to accept that some limitations were inevitable and perhaps might even have some value. There was an argument, for instance, emerging about the role of competitive and individuated learning in all of this - that it inspired some kinds of useful learning in most of us some of the time and that this should not be hidden under some 'cosy' notion of collaboration as 'a good thing'.

In different ways participants talked about degrees of collaboration and non-collaboration in the public sector and business cultures they had to operate within in their professional lives. Their learning networks encompassed family, community, friendship groups, workplaces and the postgraduate course itself. A collaborative sense of community for some was significantly determined by the amount of time 'I have been in this place'. For others the sharing of professional or family identities was more significant. Yet others accepted the term community as belonging to more transitory and functional relationships even for brief moments in time.

In order to draw on our findings and make good use of them for the purposes of curriculum development we felt we had to come to terms with operant limitations arising out of the cultural habits, mores and shared meanings of the groups with whom we worked. These cultural habits and mores were deemed to have a deep influence on our interpretation of and engagement with any group learning processes designed to promote discourse and dialogue. Within the relatively short life-span of a student's engagement with a course, they may only partially adapt to co-operative modes of learning if their professional 'norms' are located in highly competitive business environments. They may also perceive our interpretation of collaboration as more aspirational than actual. Thus our 'systematically researched and documented' debate gave us 'data' from which we could then discuss the extent to which we wanted to and were able to develop our own course culture of negotiated collaboration whilst respectfully valuing the learning potential of apparently non-collaborative behaviours and approaches. If we had wanted to research even more deeply into informing cultural attributes another approach would have been to chart the influence of previous educational and professional cultures which had contributed to each of our formation and self-concepts as learners.

Collaborating trans-culturally

Anecdotal experience by members of the course team, and in particular this author, of working with students from different national cultures on the same programme of study led to the desire to explore the extent to which students themselves felt national or regional cultural identity should also be taken into account in preparing for networked learning internationally. Each group was asked to note and then discuss whether they were aware that national/regional identity had any influence on their experiences and interpretations of networked learning and learning networks. We discussed both the dangers of internalised and externalised stereotyping and the dangers of being 'blind' to significant difference, if we were to attune our communications to and thus our learning from, one another. This was also done within a context in which theories of equal opportunities, anti-oppressive practice and trans-cultural communications already formed part of the existing curriculum.

The findings beg further development and further research beyond the scope of this paper or risk rather trivial interpretation. However, taken in the vein that the main purpose of the research questions was to raise awareness and stimulate debate, rather than to 'prove or disprove' anything about national or regional cultures I will tentatively share some of the ways in which insights were used to inform the next phase of developments.

Students in the UK and from the UK (notwithstanding some regional differences which I will not draw on here), talked about the limiting effects of a culture of individual self-reliance in pursuing more collaborative learning strategies. They talked about being overly formal, a need to overcome shyness, and 'be strong' drivers which made it difficult to ask for the help that collaboration implied. They wanted permission to share in such a way that they would not be deemed to be 'cheating', an issue which led us, for instance, to revisit definitions of plagiarism within this context. There was also a positive recognition that a culture of freedom of opinion lent itself well to engagement with critical academic debate.

Students in Ireland were aware that they were perceived as being a nation of social networkers and that this stereotype did have useful resonance in much of their experience. Phrases such as 'it's the only way you get anything done over here anyway, its what we do' were not contradicted within the group. But more subtle interpretations were also debated. One such was that 'we collaborate alright but only to a point, not so much as would give the person the advantage over you.' For those of us embedded in the culture of academia this did not seem such a foreign interpretation. We could identify fairly easily with this 'take' on collaboration.

Students in Singapore were from a variety of cultures and I share these results most tentatively of all as being Singaporean is a much more recent phenomenon than is the case with the other two 'national' groups. A quarter of the sample did not answer the question, the significance of which remains unexplained. Those who did talked about collaboration being very much a way of life in their communities and that they had difficulty in not collaborating over some aspect of academic life. Explored further this was held to mean that they did not feel comfortable challenging and arguing in public and thus felt disadvantaged in critical discourse. They needed explicit permission to challenge tutors in particular, and specific coaching in how to conduct a critical debate in public.

There were also people from all three groups who felt that cultural difference had very little bearing on how they used networks for learning. They felt either that their professional identities were already transnational and far more influential than their country of origin or workplace. Or they claimed that their organisational culture was the predominant influence on collaborative learning behaviours and approaches.

The findings, being part of an action research process, were construed as contributions to our own learning and debate and are to be seen in that light, not as accurate or factual representations of people's perceptions, feelings or experiences. They gave us a means and an experience of sharing ideas and language which we could then build on in preparing students to take account of these many interpretations when they planned to use email discussion and the intranet in their future learning on the course. In particular, the work on cultural difference and stereotype was dealt with in the context of a critical debate about the nature and value of stereotypes and not left as a literal and unexplored areas of discourse. We then attempted to weave these many voices and ideas into how we developed and used all of our teaching and learning media, not just the electronic ones.

Conclusions

The research indicated to us that the three major national groups in the study shared very similar professional attributes at one level. But they also had some clear differences especially around their expressed interest in collaboration. These findings are discussed in relation to how they might influence the implementation and effectiveness of these and further networked learning developments.

References

D'Ardenne, P and Mahtani, A (1989) *Transcultural Counselling in Action*, London:Sage

Edwards, C (1999) "Exploring the concept of Networked Learning and making technology (email/www) work for the Dialogic Process", *Learning Company Conference*, Coventry:University of Warwick

Edwards, C (1999) "Preparing professional postgraduates for world-wide learning networks", *Work Based Learning (UACE) Network Conference Taking Work Based Learning Worldwide*, Birmingham:UACE

Edwards, C and Hammond, M (1998) Introducing Email into a distance learning course. *Innovations in Education and Training International*. 35.4

McConnell, D (1998) "Developing networked learning professionals: a critical perspective", *Networked Lifelong Learning Conference*, Sheffield:University of Sheffield

Schuler, D (1996) *New Community Networks:Wired for Change*, New York: Addison Wesley Publishing

Seed, P (1990) *Introducing Network Analysis in Social Work*, London: Jessica Kingsley

Simons, G, Vazquez, C and Harris, P (1994) *Transcultural Leadership*, Houston: Gulf Publishing Co

Negotiating Practice: An analysis of an institutional dialogue about networked learning

Jonathan Foster, Nicholas Bowskill, Vic Lally, David McConnell

Department of Educational Studies
University of Sheffield
E-mail: J.J.Foster@Sheffield.ac.uk

Abstract

The following paper analyses data which has emerged from a strand of the TLTP3 Computer Based Collaborative Group Work (CBCGW) project focusing on the topic of 'institutional readiness for networked learning'. The purpose of the strand to date has been to survey and evaluate the readiness of a traditional, research-led university for implementing networked learning, specifically, networked collaborative learning. As such the survey has been concerned with a potential change process. One aspect of a potential change process is a concern with the meaning of such a process for the participants concerned (Fullan, 1991; Wenger, 1998). Drawing on the theoretical framework of communities-of-practice and on data from interviews with university staff the paper explores the economies of meaning at the University and the implications for the university's capacity to learn about networked learning.

Introduction

The CBCGW project (CBCGW, 1998-2000; Lally et al., 1999) is a Teaching and Learning Technology Programme Phase 3 project focused on the development, implementation and evaluation of computer based collaborative group work in higher education settings. These aims have led to the development of work along a number of distinct but interdependent strands. The institutional strand of the project has to date focused on the explication of issues associated with studying the readiness of an institution for implementing networked learning, mainly open & distance learning, specifically networked collaborative learning. From January-April 1999 the CBCGW Project conducted interviews with university staff at one traditional, research-led University (Foster et al., 1999). This paper re-visits this data analysing it within the theoretical framework of Communities-of-Practice (Wenger, 1998). The concept of a Community-of-Practice is introduced first along with the accompanying concept of economies-of-meaning. Two areas of an organization to which we can apply the framework are then addressed. These are: organizational design and learning architecture. The paper concludes with some comments about the capacity of the university we surveyed for learning about networked learning.

Community-of-Practice

The *locus classicus* for the theory of Communities-of-Practice is the work of Wenger (1998). Communities-of-Practice is a theoretical construct within the field of social learning, which seeks to

> *integrate the components necessary to characterize social participation as a process of learning and of knowing* (Wenger, 1998: 4-5).

The concept of a Community-of-Practice can be illustrated by the following example:

> *Across a worldwide web of computers people congregate in virtual spaces and develop shared ways of pursuing their common interests* (Wenger, 1998: 6-7).

The components, which contribute to the development of shared ways of pursuing common interests are: 'meaning', 'practice', 'community' and 'identity'. Such Communities-of-Practice are located everywhere in social life, at work, at home, as part of entertainment, in fact anywhere where we belong as members to a broader community of human beings engaged in a shared practice. Since Communities-of-Practice are pervasive in social life they also form part of organizational life. These communities may exist formally, recognised by the organization and hence institutionalised or they may exist informally outside of and even in spite of formal institutional identities. Wenger further illustrated the concept by identifying and researching a group of colleagues at a company called Alinsu who are involved in a Community-of-Practice organised around the enterprise of insurance claims processing:

> *With each other and against each other, with their employer and against their employer, they collectively orchestrate their working lives and their interpersonal relations in order to cope with their job. Colluding and colliding, conspiring and conforming, it is collectively that they make claims processing what it is in practice* (Wenger, 1998: 45-46).

An important application of the theory is to define organizations as the interaction of

> *The 'designed organization'* [...] *and the 'practice'* [...] *which gives life to the organization and* [illegible] *often a response to the designed organization* (Wenger, 1998: 241).

If our goal is to increase the potential within organizations for learning around a particular enterprise there are, according to Wenger, a number of different areas of an organization's work to which we need to turn our attention. These are: organizational design, learning architecture, and economies of meaning, which impinge on both organizational design and learning architecture. We turn first to the topic of economies of meaning.

Economies of Meaning

In the course of its life an organization will generate artefacts, which mobilise work and around which work is organised and coordinated. Organizational artefacts, which might be invoked in a discussion about networked learning at a university might include external government-related documents such as the Dearing Report and those generated by HEFCE along with internal documents such as a statement of a University's mission and university strategy documents. Reference to these artefacts justifies and legitimates work. Wenger describes however how the relationship of organizational actors to these artefacts is not a direct one but

> defined in the context of a broader economy of meaning in which the value of the meanings they produce is determined [...] the notion of economy emphasizes: 1) a social system of relative values 2) the negotiated character of these relative values 3) the possibility of accumulating "ownership of meaning" 4) the constant possibility of such positions being contested 5) systems of legitimation that to some extent regulate processes of negotiation (Wenger, 1998: 199).

Closely allied to the notion of economies of meaning then are notions of: ownership of meaning — exactly whose meaning is privileged in the relative positions adopted with regard to a particular issue? And the notion of negotiating meaning — within a system of relative values how negotiable are the positions of each actor? A focusing on such considerations has in itself a social value for in our attempts to innovate organizationally we recognise the inherently collaborative nature of the problem.

Organizational Design

Wenger proceeds to describe organizational design in terms of four dimensions: participation and reification: "trade-offs of institutionalization"; the designed and the emergent "two sources of structure in organizations"; the local and the global "combining local forms of knowledgeability"; and fields of identification and negotiability "institutional identities as key to organizational learning". Since the fourth of these dimensions relates to the issue of design for organizational learning, it is on this area that our comments are concentrated.

Among its recommendations the Dearing Report mentions that the higher education sector should:

> *Take full advantage of the advances in communications and information technology, which will radically alter the shape and delivery of learning throughout the world* (NCIHE, 1997: 10).

Nowadays educational organizations can find themselves positioned not only regionally but also globally. Indeed, the recent involvement of the University in a consortium of British and North American universities to further collaborative ventures is testament to the influence of global pressures. Other economies of meaning include external 'regimes of accountability' such as the Research Assessment Exercise and the Teaching Quality Assessment, which govern the performance of a university. The University we studied performs well in both areas but such performance can also be conceived as a potential constraint. With academic practice regulated by these external frameworks there is little time for attention to activities such as innovations in teaching & learning. There is as such little extrinsic motivation for academics within a research-led institution to get involved.

Economies of meaning also play their part internally within an organization. On the question of vision around developments in networked learning over the next five to ten years for example, the interplay of organizational identity and the potential for negotiability is clearly apparent. The University's mission statement is as follows:

> *The mission of the University is to maintain the highest standards of excellence as a research-led institution, whose staff work at the frontiers of academic enquiry and educate students in a research environment*[1].

Such a mission allows one manager to pronounce that, under current conditions,

> *It would be consistent with this university's mission to say we are not actually interested in encouraging distance learning, we are not particularly interested in encouraging networked learning as part of our strategic mission but merely to support the activities we would otherwise engage in.*

And, in a way, such a pronouncement to a large extent defines the parameters of and hence the ownership of the meaning of innovations in teaching and learning at the University. For linked to this mission are other regulatory frameworks such as incentivization in the form of finance or secondments that might exist to further developments in learning & teaching; incentives which would form part of an institutional design oriented not only towards the stimulation of research but also the stimulation of academic practice in networked teaching & learning. The mission of the University and its organizational identity clearly contribute to a situation in which research is privileged over teaching.

---

[1] The University's mission statement.

The above illustrates the various economies of meaning and differing legitimation frameworks, which impinge both internally and externally on the meaning of a change process in networked teaching & learning. Further evidence for the visibility of these economies can be obtained from an analysis of the responses to the questions posed to interviewees in our initial survey (Foster et al., 1999)in particular: 'What would it mean to say that the university is ready as an institution to support networked learning'? Here we detail some of the economies of meaning evident in the responses to these questions from the vantage point of the relative positions of managers, support staff, and academics.

Managers

The attention of managers is focused both internally and externally but again the relationship to such potential organizational artefacts as changes in an external funding regime more focused on regions is mediated by the University's organizational identity

> *At the moment this university is driven by research and that drive is basically money driven because if you do better research you get more money. If you do better teaching you don't get any more money.*

This privileging of research is such that there is no perceived crisis in teaching and learning, a crisis which would naturally lead to managed changes in this area. According to one manager, reasons which are used to justify changes in other institutions e.g. (1) student shortage and the re-focusing of markets and (2) a top-down managerial structure as a mechanism to achieve the management of change are not levers which are applicable to the University at the current time.

Support Staff

It is to management that support staff largely look for ownership of the innovation process:

> *- there has to be a clear institutional vision that's owned by senior, very senior, people in the university...basic divisional drive has to come from the very senior line.*
>
> *- much as I agree with things being done in a bottom up way there is a very big role for leadership from the top as well...both management but also the top academic level* [...] *without support from the top we are not going to go anywhere.*
>
> *- it needs to be taken on board by the most senior management and then they need to strategically plan how they are going to use information technology most effectively.*

For support staff then it is management in whom is invested the power and responsibility for an institutional design which leverages developments in networked learning. Shared involvement in the innovation process would then come at the implementation stage. Support staff also mentioned the importance of quality, particular the quality of learning & teaching materials; and such controls would be part of an external regulatory economy of meaning.

Academics

For academic practice there appear to be a number of issues, which are integral to its practice and which could be considered to be a focus on developments in interaction with institutional design by management and by academics. These issues relate to curriculum change:

> *the most important thing of all is quality control and that is not necessarily bureaucracy that's people... saying ... people aren't learning anything*
>
> *before we get telematics we have to genuinely focus on how we are going to improve our teaching and learning*
>
> *I can see some readiness in the structures that are there* [...] *but I still feel that it is a little bit devolved and the responsibility is with the departments and with course teams and I don't have the sense that there is a sort of institutional push to do things.*

It has already been mentioned that Wenger defines organizations as the interaction of institutional design with Communities-of-Practice, with the former ideally in the service of the latter. Indeed, one of the main findings identified in our earlier research (Foster et al., 1999) was to recognise these dual aspects of a university's work. Wenger further suggests that if our practices are to be inventive then scope should exist for negotiating an organizational design:

> *The point of design for learning is to make organizations ready for the emergent by serving the inventiveness of practice and the potential for innovation inherent in its emergent structure. Institution and practice cannot merge because they are different entities. The relations between them is not one of congruence, but one of negotiated alignment. And the alignment is never secured; it must constantly be negotiated anew, because it is by being of different natures that they complement each other as sources of structure* (Wenger, 1998: 262).

Having focused on organizational design and some of the accompanying economies of meaning at the University we now turn our attention to the topic of a learning architecture and its accompanying economies of meaning.

Learning Architecture

Wenger approaches an organization's learning architecture in terms of a three-way focus on 'engagement', 'imagination' and 'alignment'. In turning our attention to the economies of meaning which impinge on each of the three aspects of this learning architecture we need to ask questions such as how learning might more productively take place by negotiating the practice relating to a joint enterprise such as networked learning through engagement, imagination and alignment.

Negotiating through Engagement

The differing but relative positions adopted by managers, academics and support staff revealed by our interviews is evidence of one aspect of engagement in practice around networked learning: the negotiation of meaning. The existence of a Networked Learning Strategy group has also been one organizational focus for sustaining this negotiation of meaning.

The data also suggests that there exists much competence in the area of networked teaching and learning which is as yet untapped by the institution. We have described the current situation at the university with regard to the support of networked learning as being fragmented, that expertise exists informally, but that this has yet to be recognised formally in terms of an 'institutional home'. This will give rise to boundaries between areas of local competence. However, boundaries can also be a source of learning and Wenger advocates the fostering of 'boundary encounters' for organizational learning. Some of the external constraints on learning have been identified above; internally, in terms of engagement, the following are also applicable:

> *the way the institution is structured it doesn't seem to me to show much learning itself in terms of implementing policy.*

It can be argued that the inventive generation of new knowledge is stifled within the currently designed organizational context.

On an emergent level staff are developing competences which are not recognised within the current economies of meaning within the University. This leads to a conclusion that there is some degree of non-participation in the institutionalization of developments around information and communication technologies where staff have the competence but are not being given the experience and space with which and in which their competence can interact and develop:

> *it needs to be a proactive institution to learn for everyone in it, not just* [...] *mission statements, but ways of putting that into practice so that when somebody comes to work here they are going to contribute and take away from the university in terms of their own personal development*

Here, the dual sources of structuring in terms of the designed institution in practice and emergent personal involvement in practice are highlighted.

Negotiating through Imagination

It would be unrealistic to suggest that all members of an organization have the opportunity to engage with and influence its institutional structures. Wenger suggests however that

> *Imagination plays an important part in transcending fragmentation, bringing the global into the local and making learning an important aspect of organizational life* (Wenger, 1998: 257).

These are 'constellations' which lie beyond the immediate scope of Communities-of-Practice, but to which communities-of-practice need access

> *reflecting various connections to the organization and to the world* (Wenger, 1998: 257).

Some of these constellations may for example be institutionalized and some may not. In a higher education setting such constellations may for example be: formally recognised organizational units whose institutionally accountable remit is broader than that of the Communities-of-Practice to which it plays host, inter-disciplinary research centres, academic subject disciplines, and regional encounters between universities. What is important about such constellations is that they are candidates for institutionalization. As such they become institutional sites for identification and negotiability:

> *Reifying constellations structures the fields of identification and negotiability because it provides new material to locate oneself and opens new issues to negotiation* (Wenger, 1998: 259).

The management of networked learning and the management of the change process associated with the development of networked learning within an organizational context can be characterised as something akin to the coordination of multiple constellations:

> *...managing a concern as a constellation means that, through organizational imagination, "management" can become a feature of a whole constellation viewed as an interconnected system of practices, communities, and identities* (Wenger, 1998: 260).

Some of these constellations are institutionalised, some are not, all have some relationship to Communities-of-Practice. Such considerations return us to the idea of an organization as being situated within a set of shared economies of meaning, economies within which some meanings achieve a privileged status relative to other meanings.

Negotiating through Alignment

The third aspect of a learning architecture for Wenger is that of organizational alignment. Here practice is aligned with institutional design through prescription and with allegiance to an ownership of meaning, which is institution-wide. Through organizational alignment the scope of responsibility and the scope for negotiation is narrowed. Organizational units are localised and divided rather than located within larger constellations, which can afford opportunities for communication and negotiation.

However, awareness of the social nature of such organizational alignment leads Wenger to suggest that:

> *as instruments of alignment, leadership, authority, and policies all have the potential to become resources for negotiating meaning [...] it is a learning-based argument for participatory kinds of organizational designs focused on resources for the negotiation of meaning* (Wenger, 1998.262)

In the context of our study it does not so much matter that the University can be described as a 'hierarchical' institution. What does matter is whether there exist the resources and opportunities for negotiating the meanings of networked learning in practice.

Conclusions

After Wenger, we have defined an organization as the interaction of institutional design and Communities-of-Practice. We have also described the twin components of organizational design and learning architecture. Combining both components allows us to examine both in the service of the formation of learning communities, in our case the formation of on and off campus-based learning communities. In its organizational design we have tried to illustrate how the dual interplay between identification and negotiability represents one aspect of a movement of an organization from one whose strategies and policies are oriented towards the practice of face to face teaching towards one which formally recognises the incorporation of elements of information and communication technologies within its teaching practice. In its learning architecture the existence of organizational fragmentation could be replaced by organizational depth through the encouragement of boundary encounters between different stakeholders e.g. management, support staff, academics and students who each contribute differently to the organization's knowledgeability in networked learning.

At the heart of Communities-of-Practice and the study of organizations is the ability to negotiate meaning. As Wenger writes:

> *It is in the opportunities for negotiating meaning creatively that the learning of an organization resides* [...] *this focus on the negotiation of meaning is a focus on the potential for new meanings embedded in an organization. It is a focus not on knowledge as an accumulated commodity — as the ability to repeat the past — but on learning as a social system productive of new meanings* (Wenger, 1998: 262).

The ability to negotiate meaning in practice is related to organizational identity, organizational design and organizational learning architecture. Our attempt to elicit the relative meanings and positions of university staff in relation to the joint enterprise of networked learning is an attempt to debate and potentially change current practice within the constraints and opportunities afforded by the current economies of meaning. In this, we can also count ourselves and our work as a resource for the negotiation of those meanings.

References

CBCGW (1998-2000) The Computer Based Collaborative Group Work Project. Available at: http://collaborate.shef.ac.uk

Foster, J., Bowskill, N., Lally, V. & McConnell, D. (1999) Preparing for networked collaborative learning: an institutional view, *European Conference on Educational Research, Lahti, Finland, 23-25 September 1999*. Available at: http://www.leeds.ac.uk/educol/

Fullan, M. (1991) *The New Meaning of Educational Change*. London: Cassell.

Lally, V., McConnell, D., Bowskill, N. & Foster, J. (1999). Towards generic teaching and learning strategies through computer based collaborative group work: progress and discussion, *European Conference on Educational Research, Lahti, Finland, 23-25 September 1999*. Available at: http://www.leeds.ac.uk/educol/

NCIHE (1997) *Higher Education in the Learning Society: report of the National Committee* London: HMSO [Main Report].

Wenger, E. (1998) *Communities-of-Practice: learning, meaning, and identity*. Cambridge: Cambridge University Press.

Teaching and learning computing skills via an intranet-based course

Adrian Friday, Alan Parkes and David Nichols
Computing Department,
Lancaster University,
Lancaster
LA1 4YR

{adrian,app,dmn}@comp.lancs.ac.uk

Abstract

This paper discusses a non-majorable first year University Computing course that provides novice users with fundamental computer skills. This paper-less course, now in its second year, uses combined lecture/practical sessions in addition to the Departmental intranet and the Web. The paper focuses on key issues relating to the experience of teachers and learners in this environment.

1. Introduction

This paper discusses a non-majorable first year University Computing course (COM120) that provides novice users with fundamental computer skills. This paper-less course, now in its second year, uses combined lecture/practical sessions in addition to the Departmental intranet and the Web. The course constitutes one third of a first year undergraduate's study programme and cannot be chosen by students who are majoring in computing or who are studying first year computer science.

This paper focuses on our experiences of developing, teaching and learning in this environment and highlights key issues and experiences from staff and student perspectives.

Section two describes the course syllabus and assessment. Section three discusses the teaching methods we employ, the use of on-line resources and our experiences of teaching the course. Section four describes the course from a student perspective. We conclude with general observations about our experience.

2. Course Overview

2.1 Syllabus

The typical first year undergraduate will tend to have had a certain level of exposure to IT. This is due to changes in the National Curriculum and increased use of computers in society. We therefore assume that traditional introductory computing curricula, focussing on application skills (such as word processing, spreadsheets etc.) are becoming increasingly irrelevant.

COM120 teaches skills that will have an increasing significance in the networked world. The course focuses on the World Wide Web, its associated technologies, use and socio-economic issues. We wish our students to become active contributors to the Internet, so we teach them the requisite skills, including: Internet use, Web page design and authoring, W3C standards, validation and usability, and electronic commerce. Developing Web pages is both motivational and familiarises students with source file management (Gurwitz, 1998).

The course also covers elementary programming skills, using a gradual incremental approach. The course begins with programmable Lego robots (called Lego Mindstorms) and an associated graphical programming environment (Robolab). This establishes fundamental concepts of programming. We then cover BASIC (QBASIC), through which students acquire more advanced programming techniques, and problem solving skills. We end with Visual Basic and event driven programming, and students build Windows-style applications of their own. Topics such as interface design and VBScript are covered, to provide a link between the programming and internet aspects of the course.

2.2 Course structure

There are two themes in the course: Internet and Application Design. Both are taught concurrently in two 2-hour sessions each week. Each session is repeated three times for groups of 30 students (the capacity of the teaching laboratory).

Each session consists of a hybrid lecture practical, part taught and part supervised exercises or coursework. The material is on the departmental intranet. Each week's material is available at the start of the week and can be accessed via the Internet. Moreover, the COM120 laboratory is 24 hour access.

Though students can work through the material alone, it is designed to be delivered in the sessions. In the sessions, wall-projection of the lecturer's display enables the lecturer to discuss material in detail, and present demonstrations, ad-hoc examples and sample solutions. The students view and control the same material on their own workstation.

Each session is also attended by two postgraduate assistants. These are an invaluable support system for both students and lecturers. Students do not typically have to wait very long for help and the staff are usually kept busy. There is an informal atmosphere where students are not afraid to ask for help.

2.3 Course assessment

Students are assessed entirely on practical work (there is no examination). There are small scale Web-based and programming exercises that are assessed in-stream (where possible). Assessed exercises are completed in the students' own time and submitted electronically to the course conferencing system (run on a Lotus Domino server). There is also a Web-based dissertation on an approved topic of the students' choice. This either consists of a small collection of Web pages or a programming project accompanied by associated Web-based documentation. The dissertation reinforces the course material, as it is based on skills acquired on the course such as Web-page design, programming, etc.

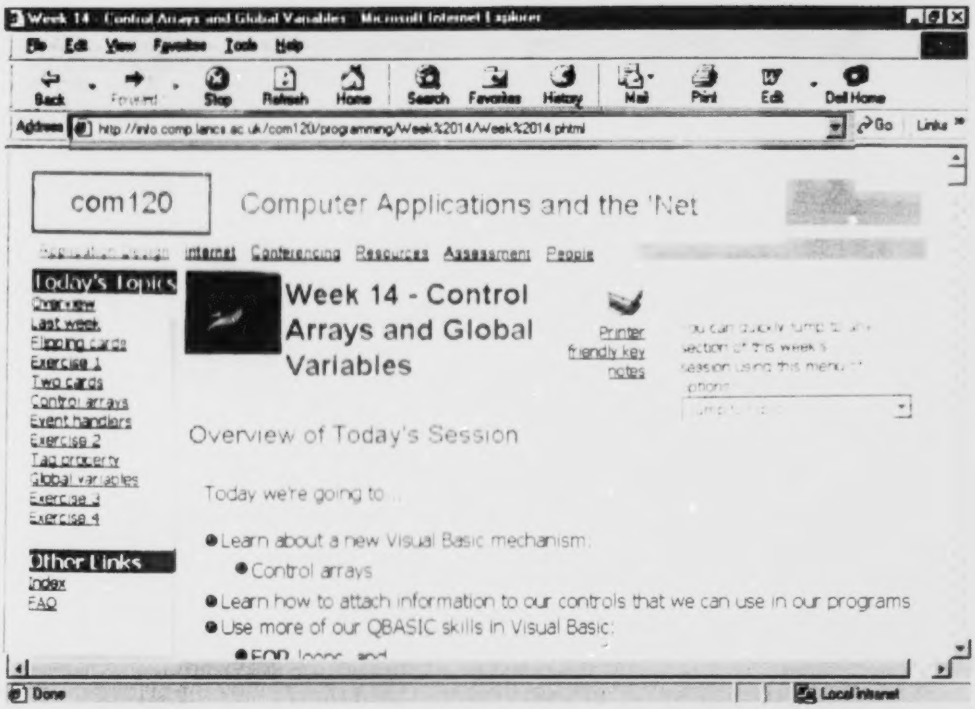
Feedback to students is provided when work is demonstrated to staff during the sessions or via email after the coursework has been assessed. An on-line system is used for students to check their own progress. The course assessment pages are now updated from a database (mySQL) and personalised using a server-side scripting language (PHP). Students can access their own performance record featuring marks and comments.

3. The Staff Experience

The course is currently nearing the end of its second year. Our experiences fall into two broad categories; development and teaching of an on-line course and teaching using the hybrid lecture/practical style.

3.1 Course Content and Delivery

Figure 1 shows a screenshot of a typical page from the Visual Basic module. Sessions usually feature taught material and exercises. The taught material tends to be delivered early to allow the more capable students to complete more advanced optional exercises later in the session.


Week 14 - Control Arrays and Global Variables - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back
Forward
Stop
Refresh
Home
Search
Favorites
History
Mail
Print
Edit
Dell Home
Address
http //info comp lancs ac uk/com120/programming/Week%2014/Week%2014 phtml
Go
Links
internet
Conferencing
Resources
Assessment
People
Today's Topics
Overview
Last week
Flipping cards
Exercise 1
Two cards
Control arrays
Event handlers
Exercise 2
Tag property
Global variables
Exercise 3
Exercise 4
Other Links
Index
FAQ
Printer friendly key notes
Done
Local intranet

com120 Computer Applications and the 'Net

Week 14 - Control Arrays and Global Variables

Overview of Today's Session

Today we're going to ...

- Learn about a new Visual Basic mechanism:
  - Control arrays
- Learn how to attach information to our controls that we can use in our programs
- Use more of our QBASIC skills in Visual Basic:

Figure 1 – A typical page taken from the Visual Basic module of the course.

The exercises are such that most students can complete them within the two hour session. We have occasionally run additional workshops to help students with the more demanding work.

Our on-line course material is intended to be self-explanatory. For each week, we also provide a link to "printer friendly key notes". These can be printed out and taken away to act as an *aide memoire*. They are also used by some students to help overcome the problems of having to keep switching between windows on the screen.

We have provided a comprehensive on-line index and a frequently asked questions (FAQ) page. Both systems are now driven from a database server to reduce the burden on authors and allow dynamic page generation.

3.2 Course Preparation

Self-explanatory course material requires considerable development time. A single week involves the development of:

- Appropriate topic(s)
- Supporting exercises – coursework, solutions, description, submission instructions and assessment criteria (~8 hours)
- Illustrative ideas and demonstrations
- Authored material (a conservative estimate is that it takes ~10 hours to produce the material for a session, once the topics and exercises are complete)
- Additions to the FAQ and indices (this takes ~2 hours), though the introduction of the database driven pages has reduced this publishing overhead

This effort is per stream (i.e. half the effort) and does not include course administration and development of the on-line support systems. There are two lecturers on each stream. As we

BEST COPY AVAILABLE

become more adept at Web page authoring and as the structures and supporting systems become more streamlined, we expect development times to reduce in the future.

3.3 On-line Support Systems

The COM120 course makes use of a number of on-line systems:

1. Intranet Web server
2. Questionnaire system
3. Course conferencing/ coursework submission system (university administered)
4. FAQ system
5. Course index
6. Mark dissemination and progress checking system
7. E-mail (university administered)

Initial development of each of the above can take as much as one working week. However, once running, the systems reduce the burden of administration. For example, publishing a new questionnaire now takes around 1 hour, roughly equivalent to the time taken to select the questions for a paper-based questionnaire. Moreover, the on-line systems can be used to support statistical analysis of questionnaire responses, etc. The weekly attendance registers are currently the only paper-based mechanism on the course.

3.4 Reflective Practice

The on-line feedback system (a questionnaire, completed and submitted anonymously on-line is available after each module) has facilitated the timely adaptation of the course to address students' concerns. We have access to many responses as they actually arrive, and can thus respond to valid concerns almost immediately.

For example, in response to last year's student feedback, we introduced the printer friendly key notes, mentioned earlier. We then discovered from the student feedback questionnaires that many students were unaware of their existence. We took steps to increase awareness of the notes. Feedback shows that many students are now using, and appreciating, these notes.

3.5 The Hybrid Teaching Sessions

The hybrid teaching style has been very successful. Reducing the time between teaching topics and applying them in practice has significant advantages; and we are able to assess the students' assimilation of the material by observing them tackling related problems. A previous version of the course, reflecting a traditional separation of lectures and practical classes, resulted in students experiencing difficulties in applying concepts from the lectures in their practical work. Urban-Lurain & Weinshank (1999) and Rodger (1996) use similar hybrid approaches for related reasons.

In the hybrid session the teacher must alternate between delivering material and tutoring individual students. Managing these transitions is challenging, as students are often so engrossed in their tasks they can miss key points being made. It is important to focus the attention of the whole group at these mode switches. Moreover, each student is actually seated at his or her own workstation, and is linked to the internet, and can easily become distracted and pay insufficient attention to the delivered material.

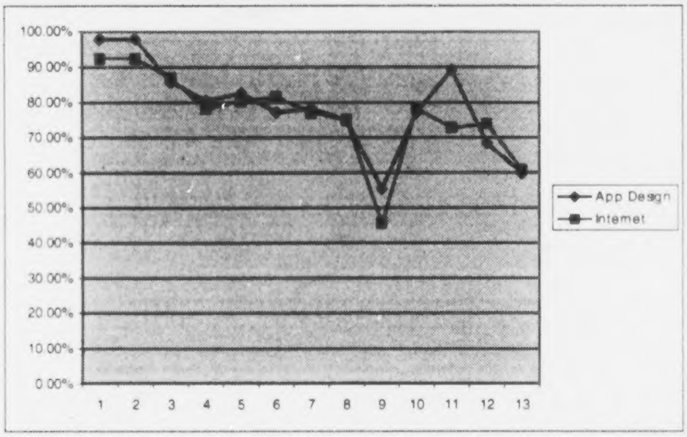


Figure 2 - Com120 attendance pattern for Michaelmas 1999 and start of Lent 2000

Our approach does require considerable staff-student contact time. However, delivering three essentially identical sessions per week has one significant advantage. As a tutor, one often perceives shortcomings in one's delivery of the material that can be quickly addressed in subsequent sessions that week.

Student attendance has been very good, compared to that for "traditional" lectures at this university. Figure 2 illustrates this year's attendance levels. Attendance is generally good, but dips slightly towards the end of the Michaelmas term. Attendance levels are not recorded for the equivalent first year Computer Science major lectures, but are known to tail off significantly. COM120 compares favourably with attendance of major students in practical laboratory sessions, despite the fact that COM120 students know that all material will be on-line and accessible outside of the timetabled sessions.

One negative aspect of the sessions relates to the physical set-up of the laboratory. The lecturer is situated in the middle of four or five rows of students. Students are more used to traditional lectures, for which the behavioural parameters are well defined. Lecturing from amongst the students makes it harder for them to detect when the lecturer is about to make an important point. It also means the lecturer has his/ her back to some of the students for much of the time. Certain students have become accustomed to ceasing work on the computer and attending to the projector screen when they see the lecturer walk towards the presentation workstation. For the lecturer, this is gratifying, as it is obvious that he or she has the attention of such students.

4. The Student Experience

4.1 Student Feedback

The students' response to this method of teaching has been generally favourable. Figure 3 shows the responses to the first three questionnaires in the "Overall category", covering the Michaelmas terms for 1998 and 1999. Direct comparison is difficult because we have restructured the course this year (QBASIC reduced from 10 weeks to 5, 5 more weeks being spent on Visual Basic).

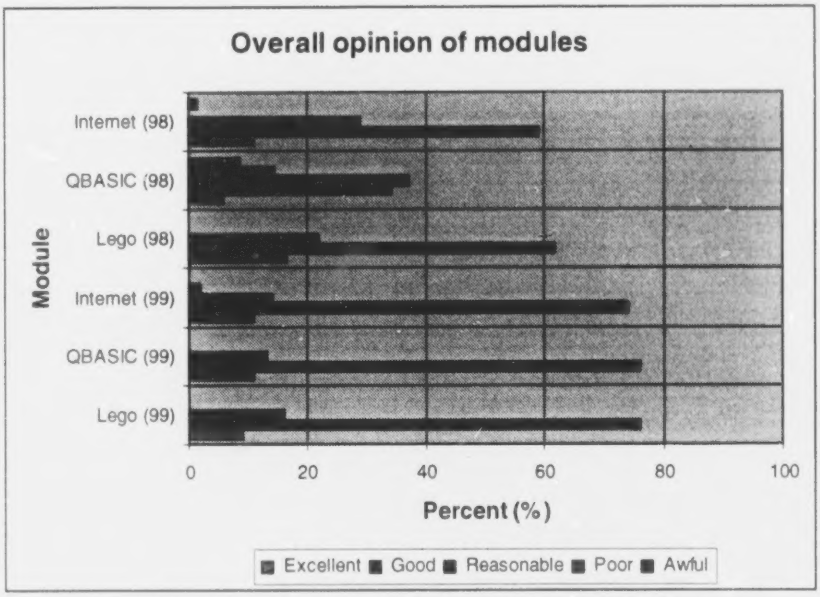


Figure 3 – Comparison of student opinion 1998-1999

From Figure 3 we see that over 70% of the students (who filled in the questionnaire[1]) rate the course as "Good" overall.

The students' responses in the optional 'comments' fields of the questionnaires is very instructive. Selected comments from this year's questionnaires, both positive and negative, are presented in Table 1[2].

Opinion on Content	although the basic programminhg skills we have been working towards are what I expected I was surprised, though pleased to see that we would be learning them in such a unique way, by using those highly advanced lego models. Need more one to one tuition. I found it was presented to us too quickly in the sessions so some of the practicals were harder to carry out because I hadn't fully understood the explanation.
Opinion on sessions	It's more motivating to be able to do both at the same time - lecture and practical. system okay but difficult to get help outside lab sessions The practical "hands on" aspect combined with a lecture works well. It was much easier to see what we had to do then go do it... It also kept the classes fluent and uninterrupted They weren't boring although they lasted 2 hours.

---

[1] Note that most questionnaires were returned by 70 or more students (from 91 registered on the course). QBASIC (99) was only completed by 46 students, we attribute this partly due to the low attendance at the end of the Michaelmas term.

[2] Comments are taken directly from the questionnaire system without editing.

	It was much more enjoyable than your "traditional" lecture style.
Opinion on Internet Stream	Much more difficult than I expected. Didn't seem to be for beginners at all a lot better!!! I loved the way we could design our own web pages!! I've enjoyed the course and it has certainly enhanced my internet usage. I thought it would just be the basics of design but it went into much more detail than I expected, which was good. I feel that more time could be dedicated to designing our own personal web page.
Opinion on QBASIC	I am really enjoying it and I have definately become more confident using a computer Fun and interesting, but each section (e.g. lego, qbasic) finishes when I want to carry on and learn more. It isn't very interesting.

Table 1 – Sample comments from the student feedback questionnaires

These comments are typical of those found in the questionnaires – one student will find the course interesting and challenging, another will express a completely opposite view. The majority of the responses are positive. Some comments bring problems to our notice. The facility for students to check their own progress, and the need to tell students about the key note pages (these were described above), both arose from student comments.

4.2 Student Commitment

For many of our students, COM120 represents a unique learning experience resulting in the acquisition of novel skills. Many of the students express surprise and delight that from early in the course they are creating their own Web pages, using email, and learning to program. Many students comment that though they find COM120 challenging, they actually derive more pleasure from it than from their major subject. Several students have expressed a desire to study further computing-related topics; currently, this avenue is not available to COM120 students, though a plan to offer COM120-style minor courses is currently being formulated.

There is no doubt that COM120 is a challenging course. For most of the students, effective learning requires full, or almost full, attendance, at the scheduled sessions, and at least two hours a week additional work. Thus, at least six hours of practical work is required. Students who miss sessions *can* catch up with the work, and we give them every possible opportunity to do so, particularly if there are good reasons for their failure to attend. Moreover, as noted above, the material is available on-line, and thus a student can ensure that they cover any missed topics before the next session.

Clearly, students who have Internet facilities at home are better equipped for working as and when they like (for example, at holidays). However, at Lancaster, most first year students live on campus, and so can take advantage of the 24-hour access provided for the COM120 laboratory.

5. Conclusions

In this paper we have described our experiences of creating, delivering and running a paperless intranet based introductory Computer Science course. Our experience suggests that this approach facilitates effective learning, but it relies on supplementing the Web-based material by tutoring and practical supervision. As on-line material encourages readers to skim the content, then a human tutor is indispensable for directing the learners' attention.

The on-line teaching and administration of the course suggests that such a course is easier and less resource-intensive to establish than a more conventional lecture based course. Our finding is that the converse is true; the taught material is more time consuming to produce and has resulted in the need to develop a number of supporting systems. The lecturing team have also been required to acquire a new range of authoring skills for presenting the course on the intranet. We suspect that some of the additional loading of the lecturing team is as a result of a redistribution of work from the department's administration and the students themselves.

We have gained a great deal of valuable experience about how we can design and prepare courses for on-line consumption. The first year taught us a number of valuable lessons and as a result we have almost completely rewritten the course in its second year. We believe that the material, its structure and the supporting on-line systems are now nearly stable and will run with only minimal modifications next academic year. The response from the students has been overwhelmingly positive – it is hard to imagine how we could hope to teach the same set of skills, using a traditional lecturing paradigm.

Acknowledgements

We would like to extend our thanks to the assistants who have made teaching this course possible: Shahram Izadi, Peter Phillips, Andrew Piggott, Dorothy Rachovides, Zoë Swiderski and Steve Viller.

References

Gurwitz, C. (1998) The Internet as a motivating theme in a math/computer core course for nonmajors. In *Proceedings of the Twenty-Ninth SIGCSE Technical Symposium on Computer Science Education*, 68-72, February 26 - March 1, 1998, Atlanta, GA, ACM.

Rodger, S.H. (1996) An interactive lecture approach to teaching computer science. In *Papers of the 26th SISCSE Technical Symposium on Computer Science Education*, 278-282, March 2 - 4, 1995, Nashville, TN, ACM.

Urban-Lurain, M. & Weinshank, D.J. (1999) "I do and I understand": mastery model learning for a large non-major course. In *Proceedings of the Thirtieth SIGCSE Technical Symposium on Computer Science Education*, 150-154, March 24 - 28, 1999, New Orleans, LA, ACM.

Links

For the interested reader, the COM120 pages can be found on the Internet:
http://info.comp.lancs.ac.uk/com120/

Activating the Web as a Virtual and Dynamic Learning Environment

Colin Fryer

Division of Construction, University of Derby, Derbyshire, United Kingdom

Abstract

In some subject areas the fusing of theory and practice can only be accomplished by demonstrating fundamental principles and their application via laboratory experiments. Although the benefits of underpinning the key conceptual and theoretical aspects with laboratory work have long been recognised, the practical and logistical problems associated with organising laboratories often results in students not fully engaging in the educational process. Unfortunately, many traditional laboratory experiments lose their impact if students are not fully prepared or appreciate the value of experimentation as an essential component in the learning process.

The advent of the WWW provides a tremendous opportunity to address some of these issues through the provision of 'virtual' laboratories where students are able to access the facilities at any time. However, the design of these information rich environments requires web authors to 'activate the Internet' through the inclusion of a range of dynamic features if the on-line learning resources are not to be static and unchanging. These tools and technologies offer unlimited possibilities in the design of virtual worlds and the development of interactive Web sites. Through the use of a case study, this paper will discuss the design of a virtual laboratory and present a range of strategies for developing dynamic and active learning material for transmission over the Internet.

Introduction

A virtual laboratory can be defined as **"a computer system that models a place, situation or the like conductive to experimentation, investigation or observation"**. The advent of Dynamic HTML (DHTML) has provided the infrastructure for Web pages to go beyond static text, images, and hyperlinks and become truly dynamic. With the cost and safety of laboratory classrooms an important consideration, virtual reality laboratories offer the opportunity for students to have unrestricted access to experiments in a highly interactive and information rich environment. It is of course essential that in any given discipline the correct balance should be found between simulated and real-world experience

A review of the literature (see Boud *et al*, 1984) suggests that the main aim of laboratory work should be to teach inquiry methodology and experimental design. It is often also reported that students do not enjoy the activity and therefore do not appreciate the main aims of establishing the links between theory and practice, to aid visualisation, and to develop team-working skills. In the case of student laboratory work, the information required will be somewhat different than that obtained in the workplace, in that the work will not be needed as part of an overall investigation but will be a single exercise intended to familiarise the student with test equipment and methods. As such, more emphasis should be given to the equipment layout, the test procedure employed, the calculations and the difficulties encountered.

Although the symbiotic relationship between theory and experimentation is explored in lectures, seminars and tutorials, it does not however impart competence, nor prepare the student for undertaking various types of experiments. The student's first encounter with a laboratory and its surroundings can be quite daunting, particularly when the types of equipment varies enormously. Additionally, the functionality of the apparatus and the method of use for particular experiments has its own learning curve that is rarely acknowledged in the learning experience. *"All too often practical classes can degenerate into routine procedures of following instructions and writing up results – activities which if not administered carefully can lead to students wasting a great deal of time to little educational effort"* (Hicks, 1997).

The **ATLAS** Project (**A**cademic and **T**echnical **L**aboratory **As**sistant) aims to address these problems by providing students with a 'virtual' laboratory that allows them open access to the facilities. The virtual laboratory allows students to explore the facilities in more detail so that they can immerse themselves within the virtual world and access knowledge in a variety of ways. Students can access technical information to assist them in writing up their experiments or view video clips of the key stages of a particular experiment. Such facilities have no time frame or restrictions on access and therefore students can observe the procedures as many times as they wish. The WWW provides the opportunity to fully integrate both theory and practice in a highly interactive environment thereby supplementing the traditional lectures.

The Problem

Soil mechanics and materials testing is studied on a variety of undergraduate and technician programmes within the University of Derby including building technology, civil engineering, construction management, geology and geography. Whilst the focus and the types of experiment undertaken by each discipline may differ, the learning outcomes associated with laboratory work are similar and well defined. That is, students should be able to

- appreciate the need for the laboratory testing of soils;
- select appropriate tests from the range available for assessing soil properties;
- appreciate the need for diligence, accuracy and general awareness of possible difficulties in all laboratory work;
- analyse and interpret laboratory data;
- write a clear and concise report of the work undertaken comparing and contrasting it with published data.

In the United Kingdom the experimental procedures relating to the methods of test for soils for civil engineering purposes are set out in British Standard 1377 (1990) and initially it is these procedures that form the basis of the ATLAS Project. A review of laboratory experimentation within the Division of Construction revealed that students experienced difficulties in being able to relate the written procedures to the equipment due to having no visual appreciation of the laboratory or the apparatus. To assist students with their experiments and provide the necessary cues and prompts a demonstrator is always present. Where groups are experiencing difficulties, the demonstrator will extend their role to that of instructor carefully guiding the group through the experimental process but avoiding becoming an additional member of the group. This instructional aspect of laboratory work is particular important and is seen as a key feature that ATLAS should incorporate.

Prior to commencing ATLAS, feedback was sought from both students and staff. From this it was concluded that if laboratory experiments are to be valid and worthwhile, students need to be able to visit the laboratory prior to its commencement and also have the opportunity to revisit so that they are more capable of relating their results to expected outcomes. The inclusion of virtual experiments was considered to be an important component of ATLAS to promote knowledge construction and extend the student's existing understanding. At present it is not conceivable to contemplate the simulation of an entire teaching laboratory. The technology is not sufficiently advanced and computer networks are often too slow and prone to sporadic failure. The best that can be achieved at the moment is modelling fairly small groups of experiments (Harrison, 1998, Raphan, 1998, Senese, 1998). Investigating what is feasible and most appropriate for student learning is one aspect of ATLAS and feedback from end users will influence how virtual experiments will develop in future versions of the Web site.

Having defined the range and type of experiments to be included in ATLAS, it was decided that the computer-based 'virtual' laboratory should include the following key features:

1. Availability over a local Intranet and/or the Internet.
2. Web documentation accessible from CD-ROM for those students without WWW connection.
3. Navigational walk through facilities.
4. Technical information underpinning the laboratory experiments.
5. A procedural statement for each experiment.
6. Interactive calculation forms for processing experimentation results.
7. Photographic images of key equipment and apparatus.

The ability to easily modify ATLAS to include further experiments at a later date, and to adapt it to for other disciplines and laboratories, was considered to be particularly important.

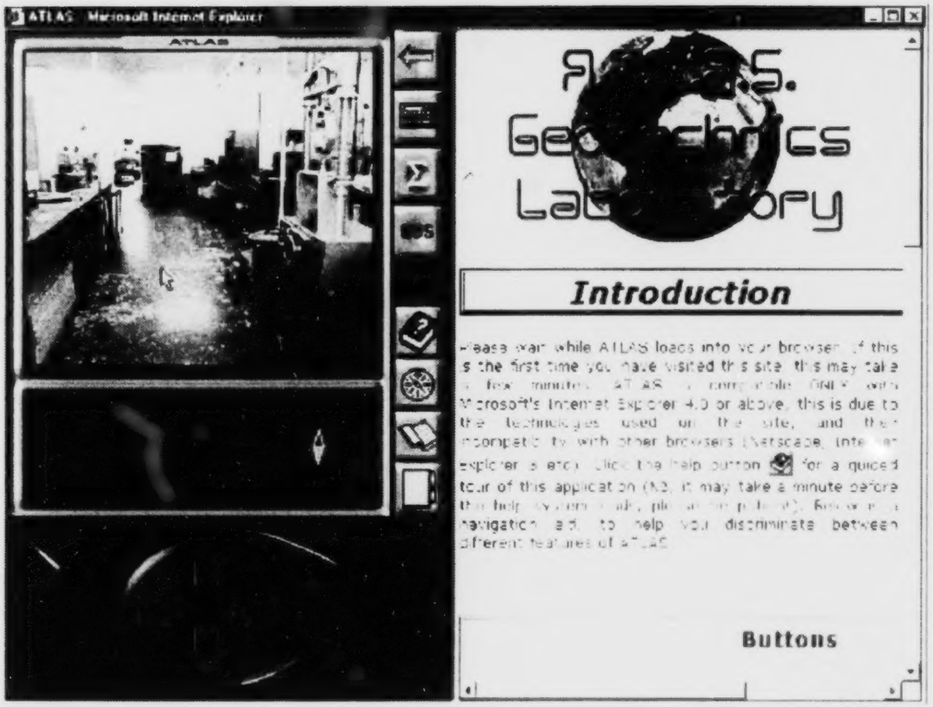
Design for Web-Based Learning

Soil mechanics is taught through a combination of formal lectures and laboratory-based exercises. In the former, students are encouraged by the tutor to engage in a constant process of active learning, constructing new ideas based on their current understanding of the subject and relating this to their previous and ongoing studies. In the latter, students acquaint themselves with laboratory procedures primarily through the medium of instruction and collaboration with their peers. It was therefore important that ATLAS would be capable of simulating these different learning environments and that the resulting Web site would have both a thoughtful interface and instructional design which work together. So how can this be achieved?

Motivating the learner

The visual impact of a Web site is particularly important in retaining the interest of the user. We are notoriously fickle and our attention keeps shifting in the pursuance of ever more interesting links and heightened experiences. A badly constructed or lack lustre site has little chance of making any impact and it will probably be consigned to the cyber-dustcart. In designing ATLAS considerable thought was given to its visual layout and how this could be related to the concept of knowledge exploration in the technological age. Rather than have the user walk through the virtual laboratory in a pedestrian way, it seemed more in keeping with Web technology to situate the user at the controls of a starship exploring new worlds with new experiences as shown in Figure 1. This helps to redefine the laboratory as a place that is interesting and not just a room filled with inanimate equipment.

Figure 1 shows the layout of the user interface where students can navigate around the laboratory, access information through a contents page or an index listing, collaborate with others using a bulletin board or make use of utilities such as an on-line calculator. The main screen is divided into four key components.



Introduction

Please wait while ATLAS loads into your browser. If this is the first time you have visited this site, this may take a few minutes. ATLAS is compatible ONLY with Microsoft's Internet Explorer 4.0 or above, this is due to the technologies used on the site, and their incompatibility with other browsers (Netscape, Internet explorer 3 etc). Click the help button for a guided tour of this application (N.B. it may take a minute before the help system loads, please be patient). [illegible] navigation aid, to help you discriminate between different features of ATLAS.

Buttons

Figure 1. *Main user interface showing the layout of ATLAS*

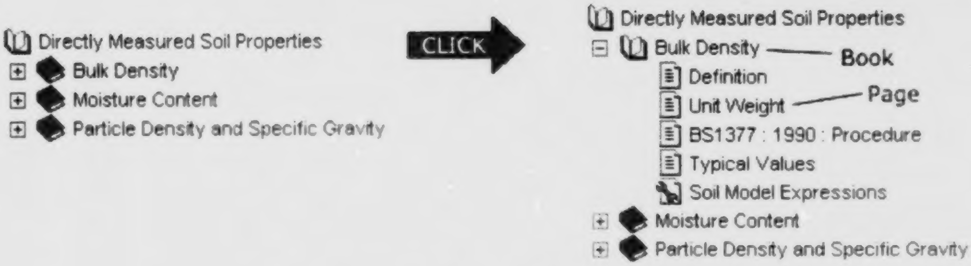
The top left-hand corner of the screen is used to present a photographic visualisation of the laboratory allowing the student to navigate through the virtual world. In the centre of the screen is the tab strip menu that provides access to a range of features including the contents page, an index, a bulletin board, on-line help, etc. The right-hand portion of the screen is used to present the learning material. The learning material is linked both to the contents page and the index with each being made visible by clicking on their respective tabs. The bottom right-hand corner of the screen contains the navigation panel that allows the user to walk through the laboratory.

Identifying what is to be learned

Developing a navigation flow that users can follow easily without getting lost is a critical design requirement for any Web site. If links to Web documents are not intuitive the site can easily become the stage set for 'Dungeons and Dragons' resulting in a complex labyrinth. If information is not easy to obtain and the student has to work hard to locate resources, the effin factor (an effort-to-interest trade-off) will increase and students interest will wane (Berline, 1960). Navigation within ATLAS is twofold; firstly, the student is able to locate themselves within the virtual laboratory and have a sense of its size and boundaries; secondly, the menu structure and linkages between documents directs the student along a carefully sign posted route that takes them from the beginning to the completion of their studies.

The contents page has been designed using *Microsoft's HTML Help* software and uses a book metaphor with chapter headings and page titles. Identifying what is to be learned is achieved by providing a well structured and clearly defined sequence of learning based on the topic headings used in the majority of soil mechanics textbooks. For each of these topics, a sub-menu system (see Figure 2) is presented.

BEST COPY AVAILABLE



Directly Measured Soil Properties
- Bulk Density
- Moisture Content
- Particle Density and Specific Gravity

Directly Measured Soil Properties
- Bulk Density
  - Definition
  - Unit Weight
  - BS1377 : 1990 : Procedure
  - Typical Values
  - Soil Model Expressions
- Moisture Content
- Particle Density and Specific Gravity

Figure 2. *Table of Contents*

Reminding users of past knowledge

The ability for students to be able to retrace their steps and return to information that reminds them of knowledge they previously learned is what makes the WWW so attractive as an educational tool. ATLAS incorporates links to other Web pages and pop-up windows that act like post-it notes jogging the student's memory to previous knowledge and maybe suggesting new directions of enquiry. It also provides (through its visual interpretation of the laboratory) a means of linking to a wide range of information by incorporating hotspots that can be interrogated by the user. For example, moving the cursor over a particular piece of equipment (see Figure 3) provides additional information. In this way, each photograph can be dynamically programmed to provide a wealth of information and allows the student to build up a complete visual picture of the laboratory, its facilities and how these relate to the experimentation procedures.

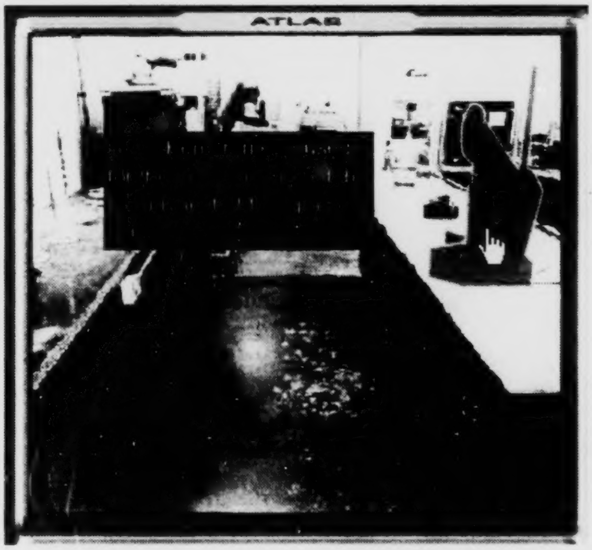


Figure 3. *Dynamic interaction*

Providing guidance and feedback

Guidance and feedback is an important component in any educational strategy providing individual students with a deeper explanation of their choices which guide them to additional information. ATLAS uses clearly labelled links that guide the student through the myriad of potential routes. Pop-up textboxes are used as a useful adjunct to hyperlinks, providing guidance and helping the student to identify other sources of information. Feedback is given

BEST COPY AVAILABLE

through programmed learning activities such as in-line assessments or multiple choice quizzes. These help to reinforce the student's understanding of the topic and allow them to monitor their progress set within a learning time frame that is controlled by themselves.

To help students familiarise themselves with the various facilities offered by ATLAS, a virtual tutor is on hand to give a guided tour. Merlin the wizard (see Figure 4) is a *Microsoft Agent Control* with sophisticated animation actions that can be programmed to provide guidance in ways that are engaging and potential educationally stimulating.

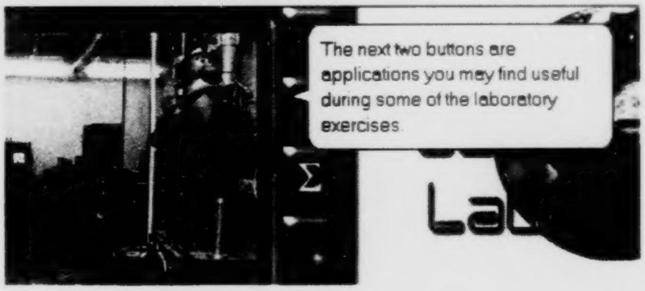
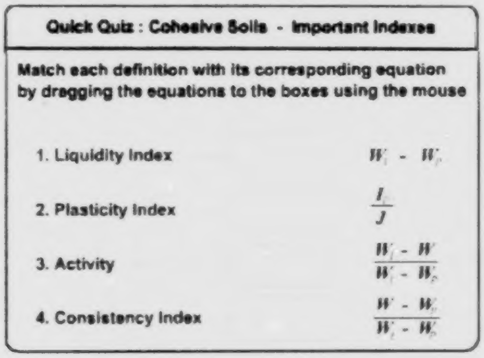

The next two buttons are applications you may find useful during some of the laboratory exercises.

Figure 4. *Merlin the Wizard*

For users with full multimedia facilities, Merlin has been programmed to include speech output helping to simulate tutor interaction. Merlin could be programmed to offer alternative solutions, question student responses based on some input, suggest links to further information or automatically load other web documents.

Testing

The testing of knowledge is an intrinsic component in monitoring the progress of a student's performance whether it be formative or summative. This helps both the tutor and student to clearly identify areas of strength and weakness and modify the learning programme accordingly. Whilst recognising the limitations of the Web (formulas cannot be directly input for example), a range of assessments have been incorporated within ATLAS from quick quizzes (see Figure 5) to tutorial questions with hints and worked solutions.


Quick Quiz : Cohesive Soils - Important Indexes

Match each definition with its corresponding equation by dragging the equations to the boxes using the mouse

1. Liquidity Index — $W_L - W_P$
2. Plasticity Index — $\frac{I_P}{J}$
3. Activity — $\frac{W_L - W}{W_L - W_P}$
4. Consistency Index — $\frac{W - W_P}{W_L - W_P}$

Figure 5. *Typical Self-Test*

Providing enrichment and remedial opportunities

The final step in many instructional programs provides learners with either remedial opportunities (in areas where comprehension is lacking), or enrichment (featuring associated information which extends or applies their knowledge). In determining the route that the student would need to take would require some means of assessment as discussed in the previous section. For example, a student achieving a low score in a specific segment of instruction may

BEST COPY AVAILABLE

be guided to additional supportive information, while the high scoring student may be challenged with a more demanding array of questions. For the purposes of evaluation, a range of learning activities have been incorporated within ATLAS including a virtual experiment, tutorial questions including feedback suggesting areas of further/supportive study and interactive calculation forms to assist students in processing their laboratory results.

Evaluation

An evaluation of ATLAS is currently being undertaken. However, initial feedback from academic staff has been very positive. All have commented favourably on the aesthetic layout of ATLAS and the ability to navigate through the laboratory in a highly interactive manner. Users were surprised and impressed with the facilities that can be created with DHTML and the way in which it liberates the developer from the rather limiting and somewhat lifeless web pages created using HTML.

The ability to embed multimedia and calculation forms into web pages has generated considerable interest and its potential has been quickly recognised. The author is aware that ATLAS requires further refinement and this is a part of an on going process. These refinements can only enhance ATLAS and provide the students with a very rich learning environment that maximises the potential of the WWW.

Conclusion

ATLAS has been developed on a modular basis and hence the potential for further development is considerable. It has been designed to allow other academic staff using the laboratory to develop their own learning material to suit their style and preferences. The potential for this project to be extended and developed in other areas of experimentation are significant and the long-term objective is for ATLAS to be able to link to other laboratories. This would considerably enhance the software and would be the basis for the development of a modular suite of programs. Considering that there is a dearth of student texts on undertaking laboratory experiments, software such as ATLAS could help to bridge the gap between theory and experimentation and thereby enhance the student learning experience.

To maximise the potential of the Internet, developers need to harness the power of DTHML, Javascript and multimedia if they hope to provide a truly interactive environment . The benefits of DHTML are many. Information can be presented in a more compelling manner, interfaces can be more responsive and easier to use, and new types of applications previously found only on CD-ROM are made possible. This will bring the web to a new level in the same way as HTML moved it from text-based information to images and hyperlinks.

The foundation blocks of the virtual laboratory have been laid, the walls are in place and the roof is securely fastened. With time it is hoped that this virtual environment will be full of rich learning experiences that provide students with a range of strategies for acquiring new knowledge in different and exciting ways.

References

BERLINE, D. (1960). *Conflict, Arousal, and Curiosity.* New York: McGraw Hill

BOUD, D., DUNN, J. and HEGARTY-HAZEL, E. (1984). *Teaching in Laboratories.* Guildford: SRHE Nelson

British Standards Institute (1990). BS 1377 Parts 1 to 9: *British Standards Methods of test for soils for civil engineering purposes*. BSI, London

HARRISON K. N., (1998), *"Information Technology for Chemistry Education"*, Department of Chemistry, University of Oxford, [WWW document], URL http://www.chem.ox.ac.uk/researchguide/knharrison.html

The Health and Safety at Work Act 1974, Her Majesty's Stationery Office

HICKS P. J., (1997), *"Re-Engineering Higher Education"*, A discussion paper, [WWW document], URL http://www.umist.ac.uk/future/re-he.html

RAPHAN T., (1998), *"Virtual Multi-Media Internet Laboratories"*, Institute of Neural and Intelligent Systems, [WWW document], URL http://www.sci.brooklyn.cuny.edu/~marciano/detailExp.html

RAMSDEN P., (1992), *"Learning to Teach in Higher Education"*. London: Routledge.

SENESE F., (1998), *"General Chemistry Online!"*, [WWW document], URL http://antoine.fsu.umd.edu/chem/senese/101/index.html

As Simple as Possible, as Complex as Necessary: An approach to the design and development of web-based learning environments

Julian Halliwell, University of Hull

Introduction

The Internet and its associated technologies have proved serendipitously to be able to offer the universal network platform upon which to build Illich's longed for "educational web" (Pickering, 1995). Instead of having to be content with the cost and limitations of discrete experimental infrastructures, developers of networked learning have been presented with a ready-made means of translating theory very rapidly into practice and of realizing their goal of new, potentially global teaching and learning environments based on accessibility, flexibility, empowerment, alternative modes of communication and so on.

Amidst the excitement of this unexpected achievement, however, it is easy to forget that the Internet was not designed for the purposes of mass participation to which it is now being put. Ordinary users – people without technical computing expertise of any kind – were very far from the minds of the Internet pioneers who could not have envisaged the outcome of their project. Email and the web have been successful amongst other reasons because: 1) they are genuinely and profoundly useful; 2) they have been developed in an "open source" spirit of universal access and standardization; and 3) by and large they work. On the other hand their success is most certainly not due to their inherent simplicity: they are far from being as straightforward to use as say a toaster, a telephone or even a television set.

Whilst acknowledging and welcoming the success of the Internet, and the web in particular, we should also recognize that this has been in spite of the fact that it is fundamentally complex as a system compared with the mass appliance technologies with which most people are familiar. This recognition should lead us, as both educational and technical developers of internet-based learning, to pay closer attention to counter-balancing the underlying user-unfriendliness of our adopted medium by placing greater value on simplicity and usability. Unfortunately, although ordinary users frequently appreciate these qualities, both pedagogical and technical designers (not to mention managers and decision makers) tend to place greater importance on having sophisticated, comprehensive and "cutting edge" functionality, without considering fully whether the resulting systems are appropriate or will ultimately be effective.

In this paper I will argue for greater emphasis to be placed upon simplicity as a key value in educational and technical design for web-based learning in the interests of achieving systems that are adequate, appropriate and effective. I will suggest that this approach is likely to lead more often to choices about what to *leave out* of the design rather than what to include. Complexity is not excluded, indeed it will often be unavoidable if the system is to be adequate, but it must be properly justified in the context in which the system is being developed and must not unnecessarily compromise effectiveness.

Why complexity should be avoided wherever possible

"Complexity means distracted effort. Simplicity means focused effort." (De Bono, 1998)

Complexity generally gives rise to difficulty. A system may be deemed to be "good" because it can fulfil a wide range of functions and satisfy many potential needs by presenting the user with a variety of features and alternative configurations from which to choose. Continually extending the range of options and functions without consideration of the effects on usability can, however, lead to uncertainty and confusion on the part of the user, who may encounter the need to make choices as a distraction from their primary goal of engaging in learning activity. Ideally the system should be transparent to the user, allowing them to focus on the course rather than on the system.

Conversely, a system may be outwardly straightforward but have an underlying structure which is unsustainably complex. This can lead to poor performance, unreliability or difficulty in maintaining and further developing the system. The more complex a system becomes, the more likely it is to go wrong.

Excessive complexity is not caused exclusively by the unchecked creative egos of technical developers. Much is made of the desirability of pedagogy-led rather than technology-led development, but both approaches can fall into the complexity trap. Clearly where technological imperatives are uppermost, there is a danger not only that usability and system performance will suffer but also that the resulting pedagogical model will be inappropriate. This I would identify as one of the key weaknesses of many "shrink-wrapped" commercial products which are marketed to appeal to the broadest range of educational providers, and offer only limited possibilities for customization. The features tables may be long and impressive, but this in no way indicates appropriateness in each of the learning contexts in which the system is deployed and it is often difficult to make adjustments without the intervention of specialist developers. On the other hand, where educational designers are given *carte blanche* – particularly those unfamiliar with online teaching and learning issues – the technical contortions sometimes performed in order to implement their requirements can result not only in confusing interfaces, but also in overly-complex underlying structures which may threaten to undermine the efficiency and sustainability of the system as a whole.

Seeking simplicity: the case of Merlin

The Merlin web-based learning environment, developed at the University of Hull, distinguishes itself most clearly from commercial "packages" by the fact that it has evolved, and continues to evolve in response to the specific local needs of the courses and initiatives it has been called upon to support (1). Continuous development implies gradually increasing complexity as the system extends to accommodate an ever wider range of disciplines, purposes and modes of delivery. The overriding objective, though, has been to produce a system which is not only *appropriate*, because it responds to genuine local needs, but also one which is and will remain demonstrably *effective*.

Achieving this second goal is, in my view, a matter of balancing the evolutionary drive towards complexity as demands on the system's capabilities increase, with a very deliberate effort to seek the simplest way of implementing genuine requirements adequately. Put differently, to be effective the system should remain *as simple as possible* and only *as complex as necessary*. The optimal balance is achieved on the one hand by ensuring that each new development justifies the complexity it introduces – in other words that it is based on the real pedagogic needs of the given context, and not the idiosyncratic inclinations of the tutor, designer or developer– and on the other by constantly searching for the simplest method of implementation.

Valuing simplicity should not be confused with adopting a simplistic approach. Achieving simplicity is itself not a simple matter and requires expertise, effort and a preparedness to completely rethink existing structures (see De Bono, 1998 for a fuller exposition). To repeat, richness and complexity have their place and will be inevitable to a greater or lesser extent; but optimal effectiveness will result from being able to keep complexity to a minimum, while still managing to produce an adequate solution. Of course, the use of such words as "necessary", "adequate", and "appropriate" implies subjectivity and discrimination, but it is precisely through experience and a broad understanding of the issues surrounding online teaching and learning – technical, educational, administrative – that informed judgements can be made. Achieving simplicity requires expert knowledge.

Example issues from the development of Merlin

Having set out the reasons for preferring a simplicity-oriented approach to system design, let us now illustrate it by considering a few examples of attempts to apply it in the development of Merlin.

Accessibility

Merlin is entirely web-based and does not require users to install any proprietary client software (such as Lotus Notes or FirstClass Client). Either of the two standard web browsers is sufficient to access and interact with most (though not all, as we shall see below) parts of the environment. Sadly, "standard" does not mean that Microsoft Internet Explorer and Netscape Navigator behave identically when rendering HTML pages, nor can their respective interfaces be referred to generically. For the system developer, the convenience offered to users by supporting both browsers is at the cost of , on the one hand extensive adjustments and sacrifices in relation to the underlying code to compensate for the browser disparities and ensure that the user's experience is the same for both, and on the other the need to be sensitive to the different interfaces when referring to browser menus and settings in user guides and support messages. Clearly this is more complex from the developer's point of view than if only one browser were to be supported, but the complexity is justified when set against the valuable simplicity of being able to access the system no matter which browser the user happens to have on their computer.

Interface design

A design is more likely to be perceived as "simple to use" if attention is paid to consistency, both internal and external. Until recently support facilities were provided in two locations in Merlin: a contextually sensitive guide was available in the top right of the screen layout accessed via an "i" (for "information") icon, and general support material was accessible by clicking a "?" button on the bottom left-hand side. Most Windows and Macintosh application interfaces use a "?" to signify "Help" and/or place a Help menu to the right of any other menus at the top of the application window. Observing that awareness of the available online help facilities appeared to be low amongst our users, we decided to unify all of the support information beneath a single "?" icon located in the top right of the interface layout. Not only was all help information simpler to access by being in one place only, it was more intuitively available by virtue of being signalled by a conventional icon and in a location consistent with other applications with which most users would be familiar.

Functionality

A common misapprehension when dealing with online course materials development occurs when tutors perceive that the web-based content templates are unable directly to handle tables, diagrams and the other layout functions they are accustomed to using in word-processing packages. A little lateral thinking brings the realization there is in fact nothing to stop them continuing to use all of the functionality of the their word-processor and then simply attaching the document for their students to download. This is admittedly slightly more complex for the users in that they must work with a second tool (albeit a very familiar one) to achieve their aims, but well justified by the advantage of being able to continue using the standard web browser instead of requiring a special client to be developed which can handle advanced formatting (the technical developer breathes a sigh of relief as the system can remain simple and sustainable!).

Audio integration

Having given three examples where simplicity has been achieved with only a relatively small cost in complexity, there is undoubtedly at least one aspect of Merlin in which a satisfactory balance has yet to be found. Since Merlin was originally developed as a platform for language teaching and learning, support for audio has always been a major feature of the environment. Web browsers and servers are themselves limited in their native ability to support audio (and video), but there are effective and freely available additional software programs which work alongside the browser to deliver acceptably high quality sound in almost real time, thanks to what is known as "streaming technology" (2). In addition to listening to recordings, users can create and share their own by using a second piece of free software together with a microphone and their computer's sound card. In principle the use of these two programs in conjunction with the Merlin web environment allows audio to be supported very effectively. In practice problems getting the audio to work continue to account for the vast majority of all requests for technical help from our users.

This is a difficult area to judge from a simplicity-oriented perspective. On the one hand there appears to be highly distracting complexity for all concerned: users, frustrated at the difficulty of getting the equipment to work; tutors, unable to rely on their students' ability to submit audio-based work; and technical staff bombarded with requests for assistance. On the other hand, audio adds an extremely powerful dimension to an otherwise text/visual-only environment: in terms of personalization, accommodation of learning styles, visual disabilities and dyslexia, and general enrichment of course content and social interaction. Audio will therefore continue to be supported in Merlin despite the regrettably limited scope for making it simpler to use.

Suggestions for a simplicity-oriented approach to design for web-based learning

To conclude I would like to offer a number of general recommendations to both technical and educational developers of online learning environments who wish to improve the effectiveness of their systems by placing greater emphasis on simplicity.

- Make simplicity, appropriateness, adequacy and effectiveness key values in your design approach. They should rank higher than comprehensiveness, being "cutting edge", matching the functionality of a rival system, or fit with an existing pedagogic/communciation model (are electronic whiteboards and real-time chat systems really worth the extra technical and usability burden they incur in every context?)

- Requirements should not be accepted at face value but should be subject to questioning and argument to ensure they are genuine and appropriate. Examine and re-examine each element of the existing or proposed design and try to identify any that are not absolutely essential for the purpose at hand. To discriminate what is important and what is not requires expertise. Educational designers must have a thorough understanding both of the subject matter and of online pedagogic principles to be able, for example, to design a task template which is simple to use but adequate for the context (in other words simple but not simplistic). Technical developers must have in-depth knowledge of their servers and operating systems to enable them to strip them down to the bare minimum components and thereby achieve optimally efficient performance and easier management.

- Opt for a modular design where possible. Where a complex structure seems unavoidable it can often be dealt with by assembling several simpler sub-structures. Merlin features a "core" framework largely consisting of communication tools used by all users, into which separately developed course and resource structures are "plugged in" according to the needs of the particular group. The environment is thus able to accommodate a wide and ever expanding variety of needs without a wholesale restructuring of the system each time.

- Consider who will benefit from introducing simplicity in each case. Given the central premise here that the inherent complexity of computers and networks requires counter-balancing, the beneficiary should normally be the end users of the system. As the example of document attachments versus radical software re-development above illustrated this will not always the case, at least in the short term. Users (online learners and teachers) will of course ultimately benefit from systems that are technically simple and efficient because they are more likely to be robust and reliable.

- Finally, be continually prepared to re-think the system design in the interests of simplicity. Systems will naturally tend to become more complex as they are developed, and so a constant quest for a simpler approach is needed which may from time to time involve re-designing certain elements – indeed perhaps the entire system – from scratch to ensure effectiveness is maintained.

Summary

In this paper I have drawn attention to the fundamental complexity of the platform upon which networked learning is largely being developed, and to the need to counter-balance this by making the learning systems we build simpler and thereby more effective. While complexity is unavoidable in some measure, where it is not fully justified it can lead to wasted effort and ineffectiveness. An approach in which simplicity and appropriateness are highly valued helps to ensure that effort at all levels is focused on the purpose of effective online teaching and learning. Prerequisite to a simplicity-oriented approach is a deep understanding of the nature both of the educational and technical issues involved: without expertise there is a risk of simplistic rather than simple and effective results.

Notes

(1) See the Merlin website at www.hull.ac.uk/merlin for more details.
(2) This is the RealMedia software available from www.real.com

References

De Bono, Edward. (1998). *Simplicity*. London: Viking.

Pickering, John. (1995). "Teaching on the Internet is Learning". *Active Learning*. Issue 2. July 1995.

IDENTIFYING THE QUALITIES NEEDED FOR A VIRTUAL LEARNING SPACE IN COMMUNICATION AND INFORMATION TECHNOLOGY SKILLS

Dr. Rachel A. Harris, Márcia A. Pereira and Duncan Davidson

Centre for Open and Distance Learning, The Robert Gordon University

Schoolhill, Aberdeen AB10 1FR, UK

1. Introduction

1.1 Background

Staff development in Communication and Information Technology (C&IT) is one of the major challenges currently facing educational institutions. In addition, while being asked to provide support for a 'lifelong learning' society (Dearing, 1997), higher education institutions look to the implementation of C&IT as a means of supporting developments in this area. C&IT staff development is thus all the more crucial, as identified by the Dearing Report itself, and others (Milligan, 1999; Atkins, 1998).

This paper presents ongoing research and development that will support educational institutions in facing these challenges via the development of a Virtual Learning Space (VLS) for C&IT staff development.

1.2 The Project

Funded by the Scottish Higher Education Funding Council, the VLS project will use a collection of existing web tools to build a 'Virtual Learning Space'. This will aim to develop C&IT skills of staff at three institutions in the North East of Scotland: The Robert Gordon University, University of Aberdeen and Aberdeen College. The creation of a space where staff can come together to share best practice, exchange ideas and establish self help groups is seen as the way forward for developing a cross-institution learning community. The project will expose a wide range of staff in Higher and Further Education to web technology they may otherwise not encounter. It will also give staff the opportunity to share ideas and explore new tools and materials without the costs associated with travelling to seminars. Once populated with experiences, the VLS will act as a knowledge pool for a wide range of 'just in time' C&IT staff development. The VLS should thus provide a useful space for academic developers, partially addressing the need for such an environment identified by the Talisman C&IT Review (Alexander, 1999).

The VLS focuses on developing C&IT skills, and will incorporate two strands:

- the Resource Pool, containing materials, tools, tips, and other information relating to C&IT skills and their application;
- the VLS Community, which will enable the sharing of ideas, problems, best practice, and other issues associated with C&IT in higher education.

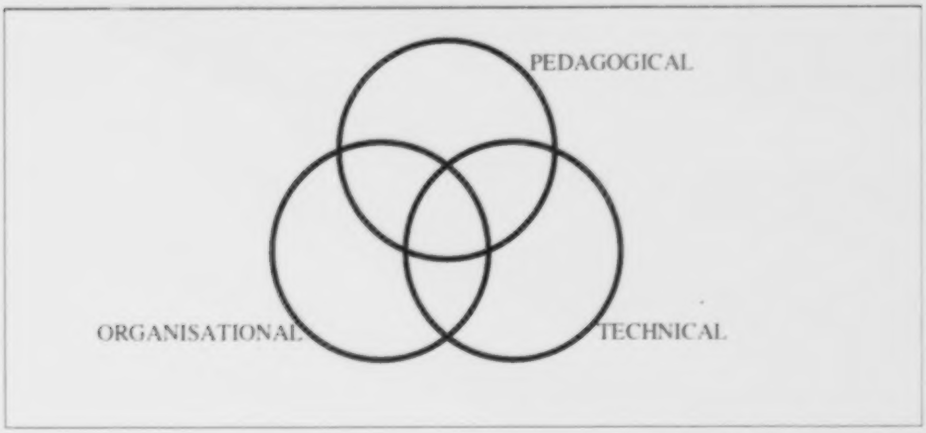
2. Approach used in developing a virtual learning space

The project consists of three stages: investigations of the requirements of the VLS, implementation and population of the VLS community. The first stage, which is reported here, involves three main areas: background investigation, evaluation of web-based tools, and the participation of stakeholders in collaboratively modelling the space. This has included developing a conceptual framework for the VLS, which has been extended in consultation with members of staff. Additionally, staff have been surveyed, to gain a profile of staff needs and expectations in terms of C&IT skills development. To ensure effective implementation, attitudes and potential motivators to participate in the VLS have also been explored in staff focus groups. The outcomes of these processes have been combined here, and the required characteristics of the VLS are discussed.

2.1 Conceptual framework

From the beginning, we felt the need to establish a framework for use as the basis for the development of the project. This would underlie the analysis of various web tools used to develop the VLS, as well as the overall design of the VLS. An initial framework based on the work of Pereira (2000) was proposed. This involved three main interrelated clusters of issues: pedagogical, organisational and technical (see Figure 1). As suggested in the figure, issues from different clusters would impinge on each other, and some issues may well relate to more than one of the cluster headings. It would therefore be important to consider pedagogical, organisational and technical issues in relation to the VLS, and attempt to carefully balance the emphasis given to each.

Figure 1: Balancing pedagogical, organisational and technical clusters of issues.



Issues within the three clusters that the project team thought would be important to the VLS are discussed in the next section. The framework was also used in discussion with focus groups from the partner institutions. The responses and suggestions from the focus groups are discussed later.

2.2 Expected profiles of issues

Technical issues that might be considered when analysing software tools include available features, specifications and costs. In relation to users, aspects such as reliable software, hardware and networks; ease of use; and access to up to date computers have a high priority (Anstey, 2000; Pereira, 2000). Indeed, a survey carried out by the SCAITS (Staff Communications and Information Technology skills) project at the University of East Anglia showed that access to new computers was second only to more training as the most significant factor needed to progress C&IT use (Anstey, 2000).

Overall, the project team felt that important technical issues would include:

- Efficient and reliable technology;
- Ease of use;
- Flexibility in adapting to fit existing IT infra-structures;
- Flexibility regarding expansion and updating.

Clearly, pedagogical aspects should also be incorporated in the analysis and design of educational software (Britain & Liber, 1999). In relation to C&IT staff development others have emphasised the need for pedagogic-led materials that incorporate a strong evaluation component (Alexander, 1999). While, Vavik (1999) proposed that the effective design and development of any computer-aided learning system should "emerge from the deliberate application of some particular theory of learning". In identifying a pedagogical basis for the VLS, it was noted that different pedagogical approaches value different forms of learning, and therefore different approaches to the design of C&IT learning applications, see Table 1.

Table 1: Different approaches to the design of learning experiences according to different educational paradigms

Theory	***View of learning***	***Learning activities***	***Design Models***	***Criticism***
Behaviourism and Information Processing Theories (Cognitive Theories)	The learning process involves outer stimuli and inner conditions: 'Learning is a relatively permanent change of behaviour that arises based on experience.' (Hilgard and Atkinson, 1967)	▪ Trainer oriented, ▪ Highly structured, ▪ Based on drill and practice, ▪ passive transfer and ▪ summative evaluation.	Instructional System Design is a concept used to describe models based on these approaches, which separate the content of the teaching and the methods (Gagné, 1967).	The prescriptiveness of this model, which views cognition as a kind of computation, does not allow for an interactive exploration of the learning experience, in a critical reflective way. It does not consider the complexity and uncertainties of practice. (See Crook, 1996; Merril, Li et al., 1990; Owen, 1999.)
Constructivist Theories and Situated Learning	This approach considers the situated character of practice and seeks to encourage the construction of knowledge by the learner, emphasising the importance of social interaction.	▪ Learner oriented ▪ Flexibly structured ▪ Highly interactive ▪ Exploratory ▪ Project based ▪ Collaborative ▪ Critically reflective	This approach encourages the design of constructive environments, where different tools can be explored by the learner. Other theories, such as socio-cultural theory and critical pedagogy complement the constructivist approach by emphasising the social character of learning and the need for critical reflection, embedded in a meaningful context. Of the design models proposed within this approach, participatory design is the most appropriate to the VLS project.	Activity theory, within the participatory design model, seems to provide the most complete framework, as it takes into consideration a broader set of issues than other constructivist models.

(Adapted from Pereira, 2000)

Educational research is undergoing a paradigm change, with the emphasis moving from behaviourist and cognitive theories towards constructivist approaches. The latter favour the flexibility demanded by modern day society, together with a learner-centred approach that emphasises lifelong learning. It therefore seemed clear that the design of the VLS should have a constructivist pedagogical basis. This would aid definition of the characteristics required of the learning environment and the web tools used to create it. This implies that we will be looking for tools that:

- are flexible, allowing the use of different media suitable to different learning needs;

BEST COPY AVAILABLE

- allow exploratory and constructive experiences;
- can be easily personalised;
- allow social interaction to take place; and
- promote critical reflection.

Regard for organisational issues is fundamental to the successful application of C&IT into learning as its effectiveness will depend on integration with the institution's overall structure. By considering organisational issues during the design of a virtual learning environment, more effective coordination and resource negotiation should take place.

For the VLS, it was anticipated that organisational issues would include:

- Integration of online activities into the overall institutional structure, including with existing staff development strategies;
- Cost-effectiveness;
- Motivation of staff to participate.

We thus had a basis on which to build the VLS, and had attempted to anticipate some of the issues the project may need to address. Next, we consider the views and perceived needs of the potential users of the VLS, i.e. staff from the partner institutions.

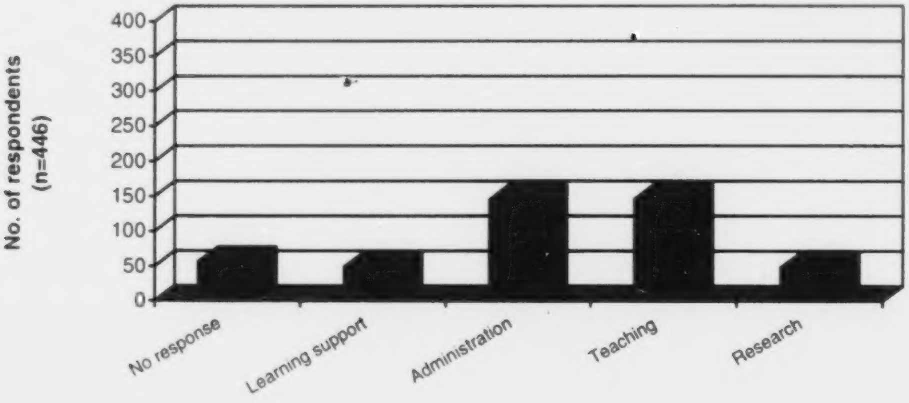
3. Surveying staff perceptions and needs

To estimate current C&IT staff development needs, a questionnaire was applied to all staff at The Robert Gordon University (RGU) in the first semester of 1999/2000. This investigated levels of competence in general C&IT skills; access to computers; use of the Internet and web based tools in general, and specifically in teaching; as well as C&IT training and support needs.

3.1 Outcome of the C&IT skills questionnaire

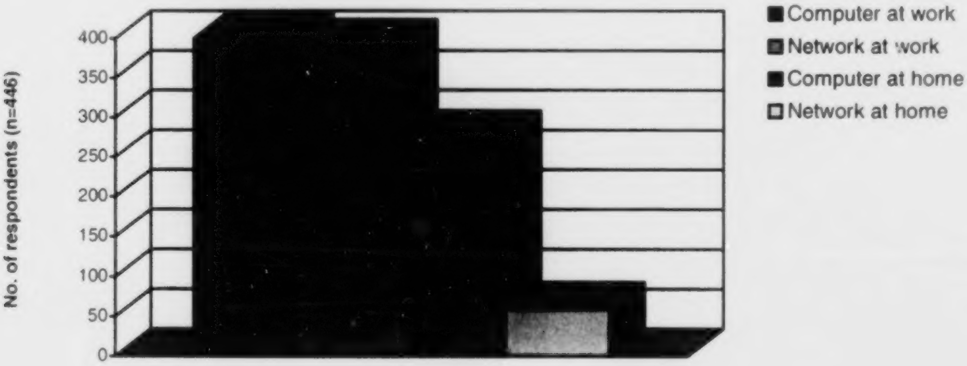
The survey had a response of around one third (n=446) with different categories of staff, academics and non-academics, contributing (see Figure 2).

Figure 2: Respondents' main area of work



Large proportions of the respondents had access to computers and to the network at work. More than half had a computer at home, but just a few of them used their home computers to access a network (see in Figure 3).

Figure 3: Respondents with access to computers



An overview of the respondents' perceived levels of competence for some of the skills included in the questionnaire are presented in Figure 4. Perhaps unsurprisingly, respondents had a high level of competence in applications such as word-processing and spreadsheets packages. The higher proportion of staff with no competence in databases may reflect the population surveyed, in that skill in this area is not a priority for many posts. Over 50% of respondents did, however, consider themselves to be at least intermediate users of web browsers, a response that encourages the development of training via this medium. Despite this, the profile for creating web pages demonstrates a low overall level of competence.

When asked to identify their C&IT training needs, a large number of respondents said that training was not a priority (see Figure 5). This may be a reflection of the demands made on staff time, and the perception of training as time intensive. (This point was highlighted in focus group discussions.) A reasonable number of respondents would like introductory training in database applications (around 27%), web page creation (around 22%), and online assessment (around 19%). The relatively low priority given to some C&IT skills, however, suggests there is still a need for raising awareness regarding the application of C&IT, an issue identified by TALISMAN in 1998 (Tomes & Higgison, 1998).

Figure 4: Respondents' perceived levels of C&IT competence

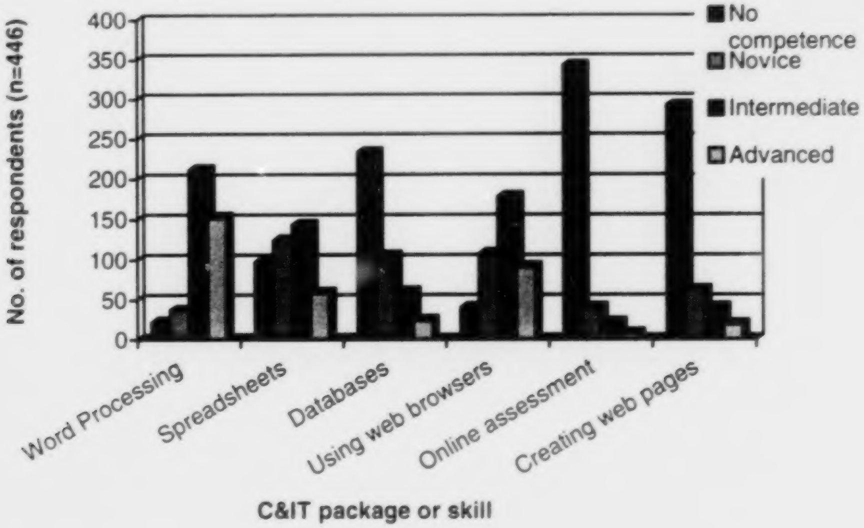
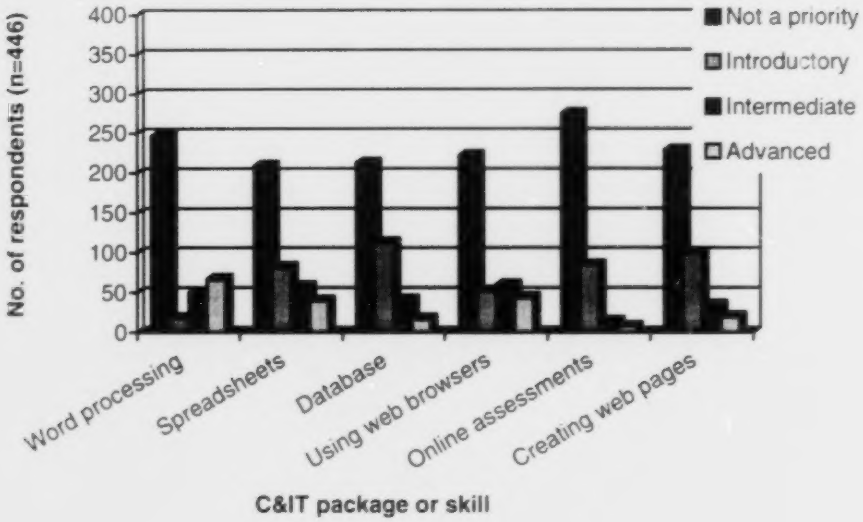
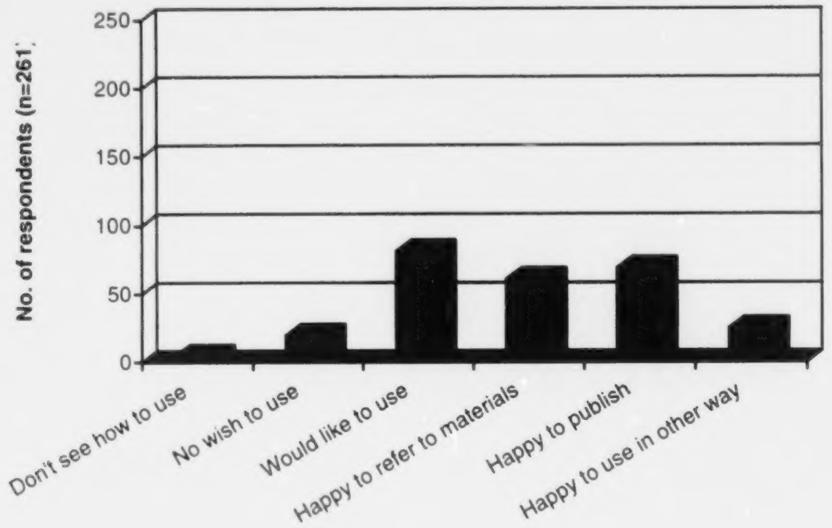


Figure 5: Respondents' C&IT training needs



Regarding the WWW, many respondents already use it for teaching (around 50% in Figure 6). There is still a high demand for support, as more than 30% of the respondents said they would like to use the WWW for teaching.

Figure 6: Respondents' attitudes to using the WWW for teaching



(Although there were only 146 respondents primarily involved in teaching, responses to the above were also provided by researchers and learning support staff who take part in some teaching.)

In general, there seems to be an ongoing need for intermediate/advanced development in 'standard' C&IT skills, and more introductory support in the newer skills, such as web page creation. Given the perceived level of expertise in using the web, and the potential of this media to support just-in-time training, e.g. small chunks available at the desktop, the VLS could provide a positive and innovative way of meeting some of the highlighted C&IT needs.

3.2 Investigating needs in focus groups

Focus groups were organised at the three partner institutions with two main objectives, to:

- identify staff needs and expectations in relation to C&IT skills development;
- and disseminate details of the project, thereby initiating a VLS community.

At RGU and the University of Aberdeen, focus groups with academic and training related staff took place separately, but at Aberdeen College both categories participated in the same focus group. With one exception, attendance at the focus groups varied from 6 to 12 participants, a reasonable number according to the literature on the subject (Stewart & Shamdasani, 1990).

The focus groups programme started with an overview of the VLS project, and moved on to review the conceptual framework. This was used as the basis for discussions on issues that the project should address. Academic staff also discussed their C&IT needs, and considered whether the greatest need was for training, the ability to share experiences, a helpdesk type consultancy, or some other form of support. The sessions finished with an online delphi type exercise in which participants were asked to enter features that would encourage them to participate in the project. All entered points were then fed back to participants, who rated each one, and overall scores for each point were compiled. This resulted in a list of ranked key motivators.

Outcome of the focus groups

The most common needs identified in the focus groups were:

- The ability to exchange experiences and ideas via a supportive community
- Recognition of time constraints
- Provision of advanced training
- Motivation

Regarding the latter, several potential motivating factors were identified. These included: user friendliness; online support; and a reliable pool of resources that provides solutions to common problems. While, the most cited staff expectations towards the VLS in terms of its qualities were:

- A supportive community that allows sharing of experiences, learning from others and reassurance
- Consultant type of advice that is concise and immediately accessible

Differences among institutions

The three institutions shared the main concern of developing a collaborative community. However, there were some differences, which portray the different characteristics of the three institutions. Aberdeen University staff emphasised the need for motivation and combining research and teaching. RGU staff put further emphasis on time constraints and the need for advanced training. Finally, Aberdeen College staff demonstrated interest in more specific issues, such as plagiarism, multilinguality, and special needs training.

Academic and training related staff views

Understandably, academic staff showed more concern with the use of C&IT in teaching. One of their main concerns being to make material available for students on the web. They were also interested in specialised IT skills and software.

Training related staff tended to be more interested in organisational and technical issues, such as integration with the strategic aims of the institution, e.g. staff development policies; accreditation; accessibility of the VLS; and the costs of production, evaluation & maintenance.

3.3 Evaluating web tools within the framework of staff needs

The proposed qualities of the VLS were used to analyse existing web-based tools, in conjunction with different evaluation studies. These included studies that focused on features, technical aspects and costs (such as the landonline review http://www.ctt.bc.ca/landonline/reviews.html) and more theoretical approaches that incorporate pedagogical and also some organisational issues (Britain & Liber, 1999). Several virtual learning environments were analysed, with the conclusion that none had all of the qualities thought to be necessary for an effective VLS for C&IT staff development. It was therefore decided to attempt to combine features from different tools into an environment that would provide a flexible basis for further development. Studies have started on the implementation of a version of RGU's Virtual Campus. This has the advantage of providing the project team with easy access to the developers of this environment, and could also facilitate the continuity of the VLS beyond the lifetime of the project. The emphasis should, however, be on developing the VLS via a continuous process of evaluation, which involves the participation of users from the three partner institutions.

4. Conclusion

This paper presented the process used for identifying the qualities needed for a virtual learning space in C&IT skills. It described the first stage of the Virtual Learning Space project, which aims to develop an online community and resources pool to support C&IT staff development at three educational institutions.

An initial framework based on the need to consider interrelated pedagogical, organisational and technical issues was proposed to guide further development of the project. It was used as a basis for discussion and analysis of findings within focus groups. The latter involved users from the three institutions and was useful in identifying common issues as well as differences.

As might have been predicted, staff highlighted different needs according to their roles within institutions and their responses reflected institutional differences. There was, however, a high level of similarity regarding main interests, expectations and motivational issues.

The findings of the focus groups confirmed the need for a VLS that allows interaction and the exchange of resources and ideas, within a collaborative and supportive community. The project should also heed participants concerns regarding time constraints, potentially by providing relevant information that is easily and quickly accessible, and perhaps by offering a consultant type advice option. The relevance of information could be enhanced by enabling self-assessment and reflection, thereby highlighting individuals' true C&IT needs. The VLS should also be reliable, well structured and up to date, and flexible enough to accommodate the different needs of individuals within different institutions.

It is clear from the use of the proposed framework that an effective approach for C&IT staff development should incorporate organisational, pedagogical and technical issues. As these issues are highly interrelated, the success of the VLS environment will depend on actions being taken in all three areas, and on a strong institutional integration and commitment.

REFERENCES:

Alexander, W. (1999) *TALISMAN C&IT Review*. http://www.talisman.hw.ac.uk/CITreview.

Anstey, P. (2000) *C&IT Skills: Developing staff C&IT capability in Higher Education*. JISC workshop, Stirling.

Atkins (1998) *An Evaluation of the Computers in Teaching Initiative and the Teaching and Learning Technology Support Network*. (HEFCE Report 98/47): http://www.niss.ac.uk/education/hefce/pub98/98_47.html

Britain, S. and Liber, O. (1999) *A Pedagogical Framework for the Evaluation of Virtual Learning Environments*. Bangor, University of Wales: http://www.jtap.ac.uk

Crook, C. (1996) *Computers and the collaborative experience of learning*. London, Routledge.

Dearing, R. and The National Commission for Investigation in Higher Education (1997) *Higher Education in the learning society*. http://www.ex.ac.uk/dearing.html

Gagné, R.M. (1967) *The conditions of learning and theory of instruction*. New York, Holt Rheinhardt Wilson.

Hilgard, E.R. and Atkinson, R.C. (1967) *Introduction to psychology*. New York: Harcourt, Brace & World. 4th ed.

Merril, M.D., Li, Z. et al. (1990) "Second generation instructional design". *Education Technology* **30**(2): 7-14.

Milligan, C. (1998) *The role of VLEs in on-line delivery of staff development*. JTAP Report 573. http://www.icbl.hw.ac.uk/jtap-573.

Owen, M. (1999) *Paradigms for curriculum design: The design of reflective, situated, collaborative professional development supported by virtual learning environments*. Bangor, School of Education, University of Wales.

Pereira, M.A. (2000) *ArchCAL: a conceptual basis for the application of information technology into learning and teaching technical subjects in architectural education*. Submitted PhD Thesis, University of Sheffield

Tomes, N. and Higgison, C.A. (1998) *TALISMAN Training Needs Analysis.* A Report for The Scottish Higher Education Funding Council. http://www.talisman.hw.ac.uk/

Stewart, D. W. and Shamdasani, P. N. (1990) *Focus Groups: Theory and Practice.* London: Sage Publications.

Vavik, L. (1999). *Pedagogy in Open Learning: Lesson 11 - Pedagogy and design of ICT based learning.* http://www.ldb.hist.no/fag/X-PedagogyInOpenLearning-EU/lessons/11/design-ict.htm

Changing Concepts of the Boundaries within ODL

VIVIEN HODGSON

Department of Management Learning
Lancaster University
E-mail v.hodgson@lancaster.ac.uk

Summary

This paper takes as its starting point the work of such authors as John Coffey (1977), who distinguishes between the removal of educational and/or administrative constraints to learning, and Richard Boot and Vivien Hodgson, (1987) who describe two main orientations to open learning, a dissemination orientation and a development orientation. The assumption is that like most conventional education ODL has, until now, taken a primarily dissemination orientation and has been concerned with the removal of mostly the administrative constraints that learners are often confronted with in conventional classroom based educational provision. It is, however, recognised that in recent times there has been a growing interest in so called constructionist approaches to education, which, together with the development of ever more information and media rich learning environments has led to a greater concern in removing educational as well as administrative constraints to learning. This has led to a much greater examination of the role of both teachers and learners, as well as examining in more detail the boundaries created due to such aspects as cultural and language differences, existing educational traditions and from gender and racial biases in educational practices.

The paper examines the work of primarily three ODL Socrates projects that will present as part of a focus group on changing concepts of the boundaries within ODL.

Introduction

In an early definition of open learning provided by John Coffey (1977), he said that open learning was the removal of both administrative and educational constraints to learning. By administrative constraints he meant such things as time, space, duration and cost and by educational constraints he meant such things as objectives, method, sequencing, entry qualifications and assessment.

In a somewhat later analysis of different orientations to open learning Richard Boot and myself (Boot and Hodgson, 1987) claimed that there was two main orientations to open learning, a dissemination orientation and a development orientation. Figure 1 summaries what we felt to be the main differences in assumptions and approaches characteristic of these two different orientations to open learning.

Fig. 1: DISSIMINATION AND DEVELOPMENT ORIENTATIONS TO OPEN LEARNING

ASSUMPTIONS ABOUT KNOWLEDGE	Knowledge as *valuable commodity* existing independently of people. Can be stored and transmitted.	Knowing as *process* of engaging with and attributing meaning to the world, including self in it.
ASSUMPTIONS ABOUT LEARNING	*Acquisition and addition* of facts, concepts and skills	*Elaboration and change* of the meaning-making processes. Enhancement of personal competence
PURPOSE OF EDUCATION	*Dissemination* of stored knowledge	*Development* of the whole person
MEANING OF INDEPENDENCE	*Individualism*	*Autonomy*
BASIS OF LEARNER CHOICE	*Cafeteria* Selection from a set range of carefully prepared dishes	*Self-catering* Planning menu's, deciding raw materials required and experimenting with ways of preparing
COURSE STRUCTURE	*Based on syllabus* The organisation and sequencing of course materials	*Based on process* of planning, deciding and experimenting
CONCERNS FOR RELEVANCE	Consideration given to problems of *application and transfer*	Participants *own working lives* regarded as prime source of learning material
TO ENGAGE SUCCESSFULLY WITH COURSE	Students encouraged to improve *study skills*	Participants encouraged to *learn to learn*
THE SOCIAL ELEMENT	Other people seen as source of *moral support*, encouragement and comparison for individualised learning task	Other people seen as *inherent part of learning* venture, providing challenge and collaboration in construction of personal meaning
TUTOR'S ROLE	*Subject expert* Guardian of knowledge. Responsible for teaching or instructing. May delegate to course media and materials	*Facilitator*, resource person and co-learner. Meanings he/she attributes to events no more valid than anyone else's
ASSESSMENT	Measure of proficiency against *externally recognised standard* Tutor as subject expert best person to judge quality of work	Part of learning process. Based on *collaborative* assessment against *mutually agreed criteria*

It could be argued that ODL has, until now, taken a primarily dissemination orientation and has been concerned with the removal of mostly the administrative constraints that learners are most often confronted with in conventional classroom based educational provision. This has been largely as a consequence of, on the one hand, the dominant educational philosophy in most countries having been one of didactic instruction and the dissemination/delivery of an accepted body of knowledge and, on the other hand, the available 'distant' technologies having been largely text and print based, supplemented in a few cases by video or broadcast. The German word for distant learning, 'Fernunterricht', meaning distribution of knowledge, reflects well the educational philosophy that is most frequently associated with ODL.

Over the last few years, however, there have been changes in both the technologies available to support ODL and in views about the preferred educational philosophy for supporting teaching and learning. The so-called active/constructionist paradigm of learning has become much more prominent in educational literature and espoused educational theory. These changes have led to a greater concern and interest in removing the educational as well as the administrative constraints to learning. Whether this has led to a move from dissemination to development orientations to open learning is perhaps a debatable point. It is also worth noting that whilst removing all constraints to learning, might at first sight appear desirable, it would in practice leave no educational provision at all. That is education of the formal kind, which is supported by public funding and seen as a political and social responsibility of governments. Consequently, from at least a formal view and perspective of education, the issue is more of one of the extent that formal education provision does or should, 'bound' learning.

Boundary crossing in ODL Socrates projects

The notion of boundaries in education is a very relevant and real one to educational projects funded by the Socrates programme of the European Commission. All of the projects that have been funded since 1995 under the ODL part of the Socrates programme have had to, by definition, work across geographical boundaries and with the consequent cultural and language differences and understandings that this creates. Cultural and language differences directly impact upon the boundaries that are associated with the nature and status of knowledge. The nature and status of knowledge has in recent times become an area that has increasingly been considered to be contentious and to be the result of social interaction and processes. Henri Giroux in his book, 'Border Crossings', (Giroux, 1992) examines the relationship between the emergence, or, to be more precise, the recognition of different knowledge communities and critical pedagogy. And several authors, in recent years, have examined the relationship and impact of technological development upon the nature and status of knowledge and the educational process. (e.g. Lyotard, 1991, Hylnka and Belland, 1991, Levy, 1994, Spender, 1995 and Castells, 1997).

Technology and educational thinking have developed enormously over the last 5- 10 years. Educational practice, however, has been much slower to change and to adapt to the changes in ideas about the status and nature of knowledge and the access to information/knowledge resulting from the advances in information and communications technology. There are many reasons why this is the case. Prominent amongst these has to be the lack of experience, training and understanding about the use of active/constructivist approaches to teaching and learning within the constraints imposed by conventional educational institutions or situations. Equally significant is the lack of experience, training and understanding of ways to use new technology to support such approaches to learning.

It is only relatively recently that educational practitioners have begun to use the advances in information and communications technology to assist them in working across some of the more difficult 'boundaries' encountered in the educational process. It is probably an accurate reflection to say that for many more it is a case of 'they would if they could.'

Almost inevitably many of the first ODL Socrates projects, like the Distant Universities before them, used advances in technology to help them remove administrative constraints to learning but not educational ones. The educational institutions involved in the projects, for the most part, not only remained clearly responsible for determining objectives, content, method and assessment criteria but also continued to follow a largely instructional, dissemination of knowledge educational philosophy of teaching and learning. More recently, however, as educationalists have become more aware of the potential of information and communications technology to support the process of working across some of the more difficult 'boundaries' encountered in education and in learning there has been an increase in projects seeking support from the Commission to explore new ways or teaching and learning and to use technology to assist them in 'boundary crossing'.

It is the work of some of these projects that I would like to examine and discuss because they offer useful nascent examples and demonstrators of how and what geographical, and more importantly, educational boundaries can be crossed, through the imaginative and collaborative use of new technology. The projects are all real life examples of ODL working across boundaries, and as such, reflect the problems, issues and constraints that this generates, as well as the power and potential of new technology to support open learning. These ODL projects each act as examples of theory and practice and thus each provide insights and understanding of the issues and the potential of technology to support open learning that aspires to the removal of some of the educational as well as the administrative constraints upon both individual learners and individual groups of learners. In this paper and focus group three specific projects are examined and discussed. These are the Learn-nett project (c.f.. paper by Bernadette Charlier Joel Bonamy and Murray Saunders) which is a Higher Education project, SocraTESS, (c.f. paper by Ole Hansen and Pia Guttrum) which is a teacher education project that focuses on special needs education. Also considered is EVA and C3 (c.f. paper by Christoph Harnischmacher and Ulrich Rauter) which are two projects that have been concerned with the development of a technology based educational model/environment that supports the authors work with disadvantaged learners. Further details about each of these projects and other Socrates ODL projects can be obtained at. http://siu.no/isoc/

The work and ideas generated by the three projects are described in detail in the three project related papers prepared for this conference and focus group session. My intention here is to attempt an update to the ideas that Richard Boot and myself produced through an initial analysis of the key assumptions and ideas that are discussed in the three papers. And, thus, begin the process of identifying what kinds of assumptions are being made by projects, such as the Socrates ODL projects, that are attempting to work across some of the more difficult and potentially more developmental educational boundaries

Changing concepts of the boundaries

If we begin then with the framework described in figure 1, we see that the different kinds of assumptions that are described are about knowledge, about learning, the purpose of education, the meaning of independence, the basis of learner choice, the course structure, the nature of the concerns for relevance, about how to engage successfully with the course, the importance attributed to the social element, the tutors role and the role and purpose of assessment.

Interestingly, examination of the ideas and concepts discussed by the three Socrates ODL projects reflect many of the concerns that we identified and described in our earlier work, for example, assumptions about knowledge, the learning process, the purpose of education, the social element and the tutor role. Although, as shown in figure 2 below the actual assumptions made are not, necessarily, the same as those that we identified at that time. Some others aspects, however, such as assessment, are not discussed very much whilst yet others that did not figure in our original framework are now quite prominent in the language and assumptions of the three projects. Examples are the concepts of communities of practice, the situated nature of learning and the significance of reflection.

Fig. 2 Contrasting Development and Constructionist Orientations to Open Learning

ASSUMPTIONS ABOUT KNOWLEDGE	Knowing as *process* of engaging with and attributing meaning to the world, including self in it.	Knowing as *process* of engaging with and attributing meaning to the world, including ones own position in it.
ASSUMPTIONS ABOUT LEARNING	*Elaboration and change* of the meaning-making processes. Enhancement of personal competence	Knowledge *is created by learners reflecting* upon and adopting new practices and learning is the *enhancement of personal effectiveness*
PURPOSE OF EDUCATION	*Development* of the whole person	Development *of personal knowledge and practice* and sense of self worth
MEANING OF INDEPENDENCE	*Autonomy*	*Autonomous authors* and creators of own learning/knowledge
BASIS OF LEARNER CHOICE	*Self-catering* Planning menu's, deciding raw materials required and experimenting with ways of preparing	
COURSE STRUCTURE	*Based on process* of planning, deciding and experimenting	
CONCERNS FOR RELEVANCE	Participants *own working lives* regarded as prime source of learning material	
TO ENGAGE SUCCESSFULLY WITH COURSE	Participants encouraged to *learn to learn*	
THE SOCIAL ELEMENT	Other people seen as *inherent part of learning* venture, providing challenge and collaboration in construction of personal meaning	Social context/situation is paramount importance. *Shared construction* achieved through dialogue and discussion
TUTOR'S ROLE	*Facilitator*, resource person and co-learner. Meanings he/she attributes to events no more valid than anyone else's	*Facilitator* who offers personal and social assistance, support and encouragement
ASSESSMENT	Part of learning process Based on *collaborative* assessment against *mutually agreed criteria*	

The importance of critical reflection is implicitly and/or explicitly referred to by all three of the projects. The importance of the situated nature of learning is referred to by all the projects whether this is by reference to what I prefer to call learning communities or to communities of young storytellers and or new communities of practice. The areas that are given the least explicit attention are, as already mentioned, assessment, (although referred to by Learn-nett as a key process or component in any educational activity or programme) the basis of learner choice, course structure and concerns for relevance.

A key and interesting aspect described by the three projects is the significance and importance of confronting states of uncertainty when working across boundaries, be they geographical, technological or pedagogical. The need to come to terms with and accept complexity and diversity when and if working across boundaries is perhaps the key idea/issue to emerge from examination of these three projects.

References

Boot, R. and Hodgson, V.E. (1987), *Open Learning, Meaning and Experience*, in Hodgson et al. Beyond Distance Teaching Towards Open Learning, Milton Keynes : S.H.R.E./Open University Press.
Castells,M. (1997) *The Information Age: Economy, Society and Culture. Vol.1 The Rise of the Network Society*, London, Blackwell Publishers.
Coffey, J. (1977) Open Learning Opportunities for mature students. In Davies,T.C. *Open Leanrning Systems for Mature Students* CET Working Paper 14
Giroux, H. (1992) *Border Crossings: Cultural Workers and the Politics of education*. London, Routledge
Hylnka, D. and Belland, J.C.(eds.) (1991) *Paradigms Regained: the Uses of Illuminative, Semiotic and Post-modern Criticisms as Modes of Inquiry in Educational Technology*. Prentice-Hall, Englewood Cliffs, NJ
Levy, P. (1994) *l'Intelligence collective: pour une anthropologie du cyberspace*, Paris: La Découverte.
Lyotard, J.E (1991) *The Inhuman: Reflections on Time*, Cambridge, Polity Press
Spender, D. (1995) *Nattering on the Net : Women, power and cyberspace*, Melbourne: Spinifex.

EQUAL OPPORTUNITIES FOR NETWORKED LEARNERS

Barbara Howell
School of Information Management
Faculty of Information and Engineering Systems
Leeds Metropolitan University
The Grange, Beckett Park Campus
Leeds, LS6 3QS, United Kingdom
B.Howell@lmu.ac.uk

Abstract

Research has been conducted on the relationship between gender and dialogue content in computer mediated environments. This paper, however, focuses on establishing possible and plausible links between gender and learning styles in a Networked Learning (NL) environment. The findings of a questionnaire distributed to M.Sc. Networked Information Engineering (NIE) students show some significant differences between male and female respondents. In particular, the results illustrating communication processes highlight interesting and perhaps unusual differences between the genders. These findings may facilitate practitioners to focus on the relationship between gender and the range of modalities available in the NL experience. Furthermore, the potential to promote equal learning opportunities.

1. Introduction

In recent years, there have been rapid developments in technology leading to the formation of the Internet, increased capacity and speed of communications and improvements in the processing power of personal computers. In addition, demographics, economic trends and social climate are ultimately changing the way institutions provide education. These advances have generated the necessity for having new learning paradigms, for example, Networked Learning (NL).

Stamartis et al. (1999), suggest, the success of a NL course depends on efficient functionality of a number of aspects concerned with the learner and the course's reliance on a number of procedures and processes, such as the interaction between the learners and instructors. Howell & Jayaratna (1999) propose the use of Soft Systems Methodology to structure the set of distance learning design activities and express, 'identification of the relevant student population', as one of the main operations in the development of specific applications. This operation includes investigation of gender and how the students want to learn etc. Kirkup & von Prümmer (1997) also recognise that gender may have an impact on new educational forms.

Therefore, in order to exploit NL, more closely match course features to the learner and enable practitioners to support learners, the diversity of the student population will have to be examined. Consequently this paper evaluates characteristics of a sample student population in relation to NL issues that may enhance or constrain learning. More specifically, the significance gender may have on NL initiatives. For instance, this paper will focus on questions such as:

1. Does gender affect the communicative processes associated with NL?
2. Do men and women approach the use of the Internet as an educational tool in different ways?

3. Can any possible differences in how a particular gender may choose to learn, be capitalised upon for recruitment (equal opportunities), retention rates, instructional design and teaching method?

To explore these questions, research was conducted in the school of Computing and Management Sciences, Sheffield Hallam University (SHU) in January 1999.

In the academic year 1998/99 fifty-three students were enrolled at the institution, on a MSc in NIE in on-line distance learning mode, at certificate, diploma and masters level. To assist the distance learning process, all the lecture notes were placed on the university web site and distributed to the students in hard copy format. To facilitate the NL process FirstClass[1] software was used for group discussions and e-mail. In addition, face to face support was provided by residential sessions, of which the two groups (postgraduate certificate and diploma) under investigation, attended in January 1999.

2. Research Methods

The author initiated the development and distribution of a two-page questionnaire, which examined the views of MSc NIE students who attended the January residential. The questionnaire comprised two sections: general questions and course specific. General questions were designed to collect information on age, gender and hardware specifications. Course specific questions focused on communication processes, learning method, format, degree of difficulty, educational needs, motivation and satisfaction levels.

The author acknowledges that the sample used for evaluation purposes was relatively small (33) and reflects the responses of one course, which might have affected the precision of the results (Moser & Kalton, 1983). Furthermore, using a readily available sample may also have its limitations (Mertens, 1998).

3. Results

Of the thirty-seven students working towards an MSc in NIE at SHU, thirty-three attended a one week residential at the institution and twenty nine of those responded (see table 1).

3.1 Characteristics of the student population

The first set of questions aimed to provide a profile of respondents. Of those who responded twenty-five were male and four were female with median age range thirty-six to fourty and thirty to thirty-five respectively. All the respondents had access to the internet and the majority had access to an adequate computer specification, which consisted of a 200 megahertz Pentium, with a 16 bit sound card, super VGA 3D capabilities and a 56k modem (see table 1)

	Total	Male	Female
N=	37	29	8
Attended residential	33	29	4
No of respondents	29	25	4
Response rate	78%	86%	50%
Median age range	36-40	36-40	30-35
Pentium >= 200	52% (15)	48% (12)	75% (3)
Modem = 56,000	48% (14)	48% (12)	50% (2)

Table 1 Respondent characteristics

3.2 Communication processes

The next set of questions related to how the students preferred to communicate, and the level of face to face contact they had with lecturers and fellow course members. When the students were asked which method they used to regularly communicate with fellow course members, 55% communicated via e-mail and 41% of the respondents did not communicate. Females respondents used e-mail more than their male counterparts with percentages of 75% and 52% respectively (see table 2)

---

[1] Software produced by SoftArc - http://www.softarc.com/

	Total		Male		Female	
Total	100%	29	100%	25	100%	4
No reply	3%	1	4%	1	0%	0
Face to face	0%	0	0%	0	0%	0
Telephone	0%	0	0%	0	0%	0
Letter	0%	0	0%	0	0%	0
Electronic mail	55%	16	52%	13	75%	3
Don't communicate	41%	12	44%	11	25%	1

Table 2: How the students regularly communication with fellow course members

The students were then asked about the level of face to face contact, from the lecturers and fellow course members, throughout the course. In relation to contact with lecturers, 68% of the male respondents and 50% of female respondents indicated that it was not enough. This must be understood in the context of a distance learning course where you might expect that the trade off between ability to study and face to face contact have to be recognized. The students do suggest later that studying by distance learning is the only way they could study with the inevitable consequence that face to face contact would diminish. Also note that the course at SHU does include time where students must attend the university to have this valuable face to face contact with their tutors. The results representing the level of face to face contact with fellow course members produced a more mixed set of opinions between the genders. It is interesting to note that the majority of females thought that the level of face to face contact with fellow students was about right and the majority of males wanted more (see table 3).

	Base		Male		Female	
Base	100%	29	100%	25	100%	4
No reply	3%	1	4%	1	0%	0
Not enough	59%	17	64%	16	25%	1
About right	34%	10	28%	7	75%	3
Too much	3%	1	4%	1	0%	0

Table 3: Face to face contact with fellow course members

3.3 Learning method

The students were then asked which feature of FirstClass they used most frequently during the course, group discussion area, private mail or other. The chat facility in FirstClass had been disabled, therefore this was not an option. The majority of respondents (69%) used the group discussion area, 14% used the private mail and 17% did not respond. Females reported a slightly higher percentage, with 75% more frequently using the discussion area in comparison to 68% of the male respondents (see table 4).

	Total		Male		Female	
Total	100%	29	100%	25	100%	4
No reply	17%	5	20%	5	0%	0
Group discussion areas	69%	20	68%	17	75%	3
Private mail	14%	4	12%	3	25%	1
Other	0%	0	0%	0	0%	0

Table 4: Features of FirstClass used most frequently

The following set of questions related to the students' use of the Internet materials. When they were asked if they would prefer the lecture material to be, only available on the Internet, 16% of the male respondents strongly agreed to agreed, 80% disagreed to strongly disagreed and 4% did not respond. All the female respondents disagreed. The students were then asked if they used the Internet notes more than the printed notes, the majority of male respondents (76%) replied, "no", 8% "yes", 12% used the mediums about the same and 4% did not respond. However only 25% of the female respondents replied, "no" and 75% used the Internet material the same as the printed notes. When the students were asked how frequently they accessed the notes on the Internet, the female respondents indicated that they accessed them more than their male counterparts (see table 5)

	Total		**Male**		**Female**	
Total	100%	29	100%	25	100%	4
No reply	3%	1	4%	1	0%	0
Never	34%	10	36%	9	25%	1
Occasionally	52%	15	48%	12	75%	3
Often	10%	3	12%	3	0%	0

Table 5: Frequency of access to the notes on the Internet

3.4 Format

When the students were asked, "what in your opinion is the primary benefit of learning using this format", fits in with work commitments was seen as the major benefit (41%) and 38% appreciated the flexible study time. The majority of female respondents (50%) thought that flexible study time was the major benefit and 25% indicated that its fits in with work commitments (see table 6).

	Total		**Male**		**Female**	
Total	100%	29	100%	25	100%	4
No reply	3%	1	4%	1	0%	0
Flexible study time	38%	11	36%	9	50%	2
Fits in with family commitments	3%	1	4%	1	0%	0
Fits in with work commitments	41%	12	44%	11	25%	1
Prefer to work on your own	3%	1	4%	1	0%	0
No commuting	7%	2	8%	2	0%	0
Other	3%	1	0%	0	25%	1

Table 6: Primary benefits of learning in on-line distance learning format

3.5 Educational needs and Motivation

The next set of question examined the students' views on the degree of difficulty, educational need, and interest levels with the course as a whole. In addition, how motivated they were to do well. The majority of respondents (percentages ranging from 90% to 96%) found the course moderately to very challenging, supporting their overall educational needs, fairly to very interesting. With these figures including all the female respondents. Finally, when the students were asked how motivated they were to do well on the course, the majority of the respondents (97%) were motivated to very motivated, with this figure also including all the female respondents. The findings within this set of questions illustrate very close similarities between the genders, however, the female respondents showed slightly higher levels of interest in the course and responses indicate that they were challenged to a greater degree.

3.6 Levels of Satisfaction, problems and difficulties

The final set of questions focused on their overall satisfaction with the course, the degree to which FirstClass would add or detract from that satisfaction, problems with their Internet Service Provider (ISP) and level of difficulties encountered when using FirstClass.

On levels of satisfaction with the course, 89% were, moderately to extremely satisfied, which also included all the female respondents. The question which related to the extent of which FirstClass would add or detract from this satisfaction produced a difference of opinion between the genders, with 16% of males indicating that FirstClass detracted considerably, 64% thought it made no difference and 16% that it assisted to assisted considerably. For the female respondents 25% thought that it made no difference and 75% thought it assisted to assisted considerably (see table 7).

	Total		Male		Female	
Total	100%	29	100%	25	100%	4
No reply	3%	1	4%	1	0%	0
Detracted considerably	14%	4	16%	4	0%	0
Detracted	0%	0	0%	0	0%	0
Made no difference	59%	17	64%	16	25%	1
Assisted	14%	4	8%	2	50%	2
Assisted considerably	10%	3	8%	2	25%	1

Table 7: To what extent did using FirstClass add/detract from that satisfaction

The students were then asked if they had any problems connecting to their ISP and if they had any difficulties using FirstClass. The majority of male respondents (76%) and 50% of the female respondents had no problems connecting to their ISP, however 20% of the males and 25% of the females experienced some problems. When the students were asked if they had any difficulties using FirstClass, the majority of female respondents (75%) and 48% of male respondents indicated that they had difficulties.

Finally, it is very pleasing to note that 83% of the respondent would recommend the course to a colleague or friend, with this figure including all the female respondents. In addition, 84% of the respondents thought that the course would enhance their career, with this percentage including all the female respondents.

4. Discussion

Characteristic data revealed that the respondents were roughly the same age. Furthermore, they utilised very similar hardware configurations. Despite these factors, there was a notable difference in the form of communication and Internet usage by gender.

Some of the respondents experienced ISP problems and e-mail difficulties. At this point the author would like to note that as a result FirstClass now has a browser interface and SHU are not experiencing the problems they had. However at the time, these difficulties may have had an impact on how regularly they communicated with fellow course members and the how frequently they used some of the features of FirstClass. It is widely recognised that men have a more positive attitude towards using the medium (Lally and Barrett 1998; Stewart 1999). In contrast to these studies the female respondents communicated with course members via e-mail more readily even though they had more difficulties with the medium than their male counterparts. These finding could indicate that females are less likely to allow technical difficulties to impede their preferred mode of communications (Pickett 1999). Additional rationale could include an appreciation by the female gender of the medium's ability to liberate discourse or that it facilitates the engagement of socio-emotional patterns of communication (Ferris 1996).

In relation to face to face contact with lecturers, differences between the genders were negligible. However, the majority of female respondents indicated that the face to face contact with fellow course members was about right. In contrast, the majority of males would have liked more. Therefore the findings could suggest that some of the male respondents prefer the immediacy of face to face interaction (Shaw and Polovina 1999). They may have had a greater need for physical presence (Keegan 1994; Furnell 1999), or the need to establish a sense of community (McConnell 1998) more commonly associated with traditional university based teaching and learning.

In relation to how the respondents approached the use of the Internet as an educational tool, a few of the male respondents would prefer the course notes to be only available on the Internet. Whilst all the female respondents disagreed with this assertion. Furthermore, in relation to using the Internet material, the majority of females used both printed notes and Internet notes about the same, however, the males used the printed notes more readily. In addition, more males than females never accessed the notes on the Internet. This could pose questions on the degree of difficulty a particular gender may have with reading, digesting and assimilating on screen information. Other issues could include a particular genders desire to annotate the notes in pen, or the inherent need of students within the age group (36-40) of the study for paper based information. However, providing two methods for the dissemination of lecture notes will facilitate learner choices induced by the diverse learning styles of the genders. Mazoue (1999) confirms the need to focus pedagogical direction for different populations of learner.

Finally, the majority of respondents found the course challenging, meeting educational needs, satisfactory overall and they were motivated to do well. However some of the male respondents found that FirstClass detracted from their satisfaction. This factor can be directly correlated to the males who had difficulties with FirstClass. Conversely, levels of dissatisfaction for the female respondents could not be attributed to the difficulties they had with FirstClass. Hence the argument that the female gender has a greater ability to deal with technical difficulties is further supported.

5. Conclusions

The purpose of this research exercise was to establish possible and plausible links between gender and learning styles in a NL environment. Although the sample used for evaluation purposes only reflect the responses from one course, the findings show some notable differences between male and female respondents. For example, the female respondents found the NL format more agreeable, in particular the aspects pertaining to electronic communications. They also adopted a different approach to using Web based materials. These observations may facilitate practitioners to focus on the relationship between gender and the range of modalities available in the NL experience.

6. Future Research

Whilst nothing conclusive can be derived the set of results, the findings point to the need for further research to be conducted in order to explore the gender related differences relative to the usage of web based materials. Furthermore, to provide corroborative evidence in the form of qualitative as well as quantitative analysis to express clear justification to the notion that females within the profile of this study, exhibit less reliance on face to face interaction than their male counterparts.

7. Acknowledgement

The author would like thank Geoff Cutts, head of the postgraduate programme at SHU, for supporting the presentation of the research results and Susanne Henderson, course administrator at SHU, for providing general information on enrolment. In addition, Anthony Drinkwater who was a full time MSc NIE student at SHU for assisting the development, distribution, collection and collation of the questionnaire data.

References

Furnell, S. M. et al. (1999) Online Distance Learning: Expectations, Requirements and Barriers. *Virtual University Journal*. Vol. **2**, No. 2, pp. 34-43(10).

Ferris, S. P. (1996) Women On-line: Cultural and Relational Aspects of Women's Communication in On-line Discussion Groups. *Interpersonal Computing and Technology Journal*. **4**, No. 3-4, pp. 29-40.

Howell, B., & Jayaratna, N. (2000) Demonstration of how Soft Systems Methodology can be used to structure the issues associated with Distance Learning activities. In: Orange, G., & Hobbs, D. (Eds.) *International Perspective on Tele-education and Virtual Learning Environments*. Ashgate. pp. 91-108.

Keegan, D. (1994) *Otto Peters on Distance education. The Industrialization of Teaching and Learning*. Routledge, London. pp. 220-224.

Kirkup, G., & von Prümmer, C. (1997) Distance Education for European Women: the threats and opportunities of new educational forms and media. *The European Journal of Women's Studies*. Vol. 4, pp. 39-62.

Lally, V., & Barrett, E. (1998) Gender Differences in an On-line Learning Environment: A Case study. In proceeding of: *The 1998 International Conference on Network Lifelong Learning*. University of Sheffield.

Mazoue, J. G. (1999) The essentials of effective online instruction. *Campus-Wide Information system*. 16:3, pp. 95-104. On-line: http://www.emerald-library.com/brev/16516cd1.htm

McConnell, D (1998) Developing Learning Professionals: A Critical Perspective. In proceeding of: *The 1998 International Conference on Network Lifelong Learning*. University of Sheffield.

Merten, D. M. (1998) *Research methods in education and psychology*. SAGE Publications, Inc.

Moser, C. A and Kalton, G. (1983) *Survey Methods in Social Investigation*. Gower.

Pickett, A. M. (1999) *Factors Influencing Students Satisfaction and Perceive Learning with Online Courses*. In proceedings: The 5th International Conference. Asynchronous Learning Networks. University of Maryland University College.
Online: http://www.aln.org/alnconf99/presentations/convertedfiles/53/

Shaw, S & Polovina, S (1999) Practical Experiences of, and Lessons Learnt from, Internet Technologies in Higher Education. *Education Technology & Society*. 2(3).
On-Line: http://ifets.ieee.org/periondical/vol_3_99/stephen_shaw.html

Stamartis, D., Kefalas, P., & Kargidis, T. (1999). A multi-agent framework to assist networked learning. *Journal of Computer Assisted Learning*. **15**, pp 201-210

Steward, C. M. et al. (1999) Gender and Participation in Synchronous CMC: An IRC Case Study. *Interpersonal Computing and Technology Journal*. **7**, No. 1-2.

Understanding students' experiences of collaborative networked learning

Christopher R. Jones,
CSALT, Department of Educational Research,
Cartmel College,
Lancaster University,
Lancaster LA1 4YL.
Tel: 01524 - 593421
E-mail: c.r.jones@lancaster.ac.uk

Key words: collaboration; design; phenomenography

This paper explores students' experiences of collaborative learning mediated by a computer conferencing system. The paper presents initial findings from a set of interviews carried out as part of the JISC/CALT project Networked Learning in Higher Education. The paper examines students' work on a collaborative assignment as part of a distance learning course using individual interviews. The methodological approach adopted is broadly phenomenographic (Marton 1994). In addition to interview data the author was the local tutor and observed the course in progress. The paper complements a recent research report, which provides an overview of the course and places the project assignment in the overall course setting (Kear and Heap 1999).

The paper explores the relationship between course content and the process of work. It examines the assessment criteria and interpretations made of them by students. It goes on to examine the variety of interpretations that the students had and what impact it had on their assessed work. This is complemented by comparison with the work done by students working collaboratively in a place based setting (Jones and Cawood 1998). In particular the use of available technologies is explored and the ways in which students bring together the variety of communication channels that are available. It is noted how students use communications outside the conferencing system despite explicit instructions to work within the system.

Introduction

This paper arises from the work of the JISC/CALT-funded 'Networked Learning in Higher Education' project. Networked learning is a term that has had a currency for some years and can be seen as part of a new paradigm in education (Harasim 1995; Koschmann 1996; Romiszowski and Ravitz 1997). We have defined networked learning as:

> learning in which C&IT is used to promote connections: between one learner and other learners, between learners and tutors; between a learning community and its learning resources.

The project aims to understand students' experiences of networked learning. We believe there is a need to understand networked learning from the students' perspectives for three main reasons:

- There has been little good research on the ways in which students actually learn with new technology
- The general literature on student learning in HE makes it clear that learning outcomes are significantly affected by the approach to the learning task adopted by the student. (Entwistle and Ramsden 1983, Marton and Booth 1997)

- The significant examples of system failure in sectors that have introduced IT and have not understood the work done from the perspective of those carrying out the work (Randall et al 1994).

The space of possibilities for networked learning is vast, for this reason the project has identified some priority areas on which attention should be focused. The observations reported here concerns a course that makes use of asynchronous communications technologies to support collaborative learning among geographically and /or temporally distributed group of students.

We report findings from interviews with ten Open University students about their work on the final project of Information Technology and Society (THD 204), a second level course. The project assignment was double weighted and provided an opportunity for students to synthesise the different elements of the course and to experience collaborative work in a computer conferencing environment. A full description of the course can be found in Kear and Heap (1999).

Methodology

The NL in HE project is informed by a phenomenographic approach, which provides a linkage between the various aspects of the overall project. Ference Marton explained phenomenography as a research approach for understanding people's ways of experiencing the world. He defined the approach as:

> the empirical study of the differing ways in which people experience, perceive, apprehend, understand, or conceptualize various phenomena in, and aspects of, the world around them (Marton 1994 p4424).

A phenomenographic approach is used in this case to describe the qualitatively different ways that students experience networked learning. The objective is to illuminate the *variations* in ways of experiencing networked learning (Marton & Booth, 1997; Laurillard, 1993). This approach, which focuses particularly on student activity, has informed both theories of teaching and learning (Biggs 1999, Prosser and Trigwell 1999).

The emphasis in the interviews we conducted was in stimulating the students' reflection upon their own experience, this conforms to Marton's view that the phenomenographic interview provokes a change from unreflected to reflected awareness (Marton 1994). In the interview, the aim was to:

> make things which are unthematized and implicit into objects of reflection, and hence thematized and explicit (Marton, 1994:4427).

The analysis of the interview data has concentrated on the written transcripts of the interviews taken verbatim from audio recording. The interviews have been examined, using NVivo qualitative research software, for variations in the experiences of the students and to try and identify emergent elements that might be common between them. The analytic process in phenomenographic research is iterative, once categories of description are found they can be reapplied to the data that they originate from. The results reported in this paper are an initial set of categories and they are currently being reapplied to the data and reported back to participants.

Criticisms of Phenomenography

Phenomenographic research has been criticised from an ethnomethodological perspective for its reliance upon the interview (Fleming 1986). Fleming gives an example of 'versions' - that is, of an individual giving a series of accounts of one event to a variety of audiences. Each account is different, each is fitted to its particular purpose and might appear to be out of place in another setting. The point being that all accounts are partial, that they point towards something but cannot contain all the information required for a complete description of that which is being described. A recent critical review of phenomenography offers a 'constructionist' revision of traditional phenomenographic approaches (Richardson 1999). Richardson argues that conceptions of reality are discursive practices, which may be used as resources in particular communicative encounters, rather than psychological entities that reside in the minds of individuals (op.cit. p72). Richardson argues for more attention to be paid to accounts given by participants in real-life situations. As a tutor I was a participant on the course and observed the course interaction. I was able to place in a rich context the interview material and this helped to situate the interview.

Findings

The interviews were conducted with ten students. The local tutor group had been divided previously into four groups by the tutor. This had been done to spread academic standards and the gender of participants. Each group contained five members, four male and one female in each group. The interviewees were selected to give a spread from all four groups. Three groups provided two interviews one group provided four. The initial selection was made from the students nearest the city centre where tutorials had been held. An attempt was made to interview all five students in one group but one student had moved and proved unobtainable. The students were asked to begin by telling the interviewer how they approached the project, TMA 06.

Assessment

The assignment book for the project TMA 06 was a separate booklet some 12 pages in length, which gave detailed instructions on what was expected. The booklet contained sections on the aims of the group project, activity, report structure, mark allocation and advice on establishing group working. The aims were given in six bullet points. These included integration of course issues and two bullet points that mentioned peer group and co-operative work. The mark allocation was as follows:

Group element	**(total 30%)**
Report Summary	10%
Themes discussion in conference	10%
Report conclusion	10%
Individual element	**(total 70%)**
General structure and coherence of argument	30%
Use of supporting evidence and course materials	20%
Contribution to group tasks and discussion in conference	20%

Students interpreted these aims differently. An example of two contrasting interpretations in one group is illustrated in the following quotations (Interviewer in italics):

> *What did you conceive that task to be?*

> I would assume that it was more to continue the computer mediated conferencing as an exercise in itself for people to work together to sort of exchange ideas and irrespective of what the particular project was to work on. (Daniel)

> *What do you think the emphasis was?*
> Your personal individual um your personal big 500 words or whatever
> *So the individual submission was ....*
> Was more important than the group work
> *And how about content and process if we split it that way?*
> Content
> *Rather than process...*
> Rather than process and yet it's, I would argue the process probably took as much time as writing the content if not more (Lillian)

The two students were co-operating in the same group to produce a joint project yet they had different views of the task they had been set. Despite extensive documentary guidance being provided. When prompted to re-read the booklet Daniel who had identified the task as being to conduct group work revised his view and conceded that content may have been more important.

> *Well does the assessment scheme reflect the view you had ...?*
> Um probably thinking about it in that way erm probably not. It's more, unless I'm miss-reading it, it's more the content than how it was achieved so it doesn't cover the process therefore really.

Amongst the interviewed students it was his initial view that was most common. The view expressed by Lillian that emphasised content and individual work was uncommon. Her view was clearly instrumental and she clearly expressed the view that she worked to the assessment guidance:

> I'm sorry but I wrote my answers to the marking scheme, absolutely............

This student was an experienced OU student and she contrasted her practice in this course with those studied previously. Her mark was high for the TMA and consistent with her course average. Her exam mark exceeded her course work average by a full ten points. An unusual relationship in a tutorial group where generally the examination results were similar to, or lower than, the coursework average.

Daniel was less focused on the assessment criteria:

> I don't think I actually used the marking scheme to structure my answer, maybe I was wrong

His marks, one grade below Lillian's, were extremely consistent, his course average, exam and TMA 06 mark varied by only 2 points in total.

The other two students interviewed from this group inclined to the view that the TMA was concerned with how the work was done rather than content. Lillian was the group's co-ordinator or 'bully' and the group exhibited a strongly instrumental approach. Whilst this was commented on, by at least one other student, no one complained that their interpretation of the assessment guidance had been ignored or overridden.

Time matters

In order to complete their work in distributed groups the students had to confront problems around the management of time. The different groups all resorted to a variety of synchronous media to get their work completed. The quote below from Martin is representative:

> We did have deadlines and a lot of the conversation again was on the private chat in fact I think there was a stage where we actually had a two hour communication which I could see my telephone bill going through the roof, but basically it was essential. I think the thing on the private chat was there was a hell of a lot could be covered ……………, it was like a dialogue rather than the actual communication on the conference it just felt as if we'd never really communicated on the conference it was more or less people working in isolation

Other groups tried to meet face-to-face, but this often failed because other group members were not available. Those groups that used the synchronous chat facility in FirstClass found it useful and reported the experience positively. One group used the ordinary messaging system for synchronous activity, this allowed the system to automatically record the postings, but clogged the conference with large quantities of post. The reasons for needing synchronous communication concerned working to deadlines. Students also reported that having used synchronous media they felt closer to the other students, more emotionally connected:

> *So why was the chat better than using the ordinary mailing system?*
> I think the chat was better because it was more on-line, whereas with the messaging it was sort of you put the messages up. Well I don't know because even the messaging one could be on-line but we just seemed to use the chat because it was more conversational really. I think it was just easier to use. You could see who was in the group at that time, you could see who was watching your responses and you could reply to those. (Julie)

The students used a variety of media that were not naturally recorded, synchronous chat had to be cut and pasted into a word processor to be saved. The Assessment booklet included the following guidance:

> The most important point to remember is that the group conference should provide a record of all the important discussions, decisions and contributions, since it will be the only permanent record available to your tutor for grading that part of the assignment. Should your group live close enough together to permit face-to-face meetings, then any discussion and decisions made at such meetings should be summarised and recorded in the conference (Assessment Book 2 p8)

During the interviews it became evident that at least two sets of communications had taken place outside the conferences. One concerned a student who had gone off-line for a week at a critical period. The negotiation with the group leader took place by telephone and only a limited report of the outcome entered the conference. In a second group a more substantial portion of the work was off-line and wasn't evident in the conference:

> *Did you work to deadlines on that, ………..*
> We did have deadlines and a lot of the conversation again was on the private chat. In fact I think there was a stage where we actually had a two hour communication……….. it's unfortunate that it had to take place outside but this was the main reason that we wanted to post, to cut and paste the information in, to say "right we've had these conversations outside but we couldn't communicate within that forum" (Martin)

In at least one other group synchronous chat had been lost during a conversation despite an attempt to save it.

Conclusions

The work reported here complements the analysis of the same course by Kear and Heap (1999). They report the overall success of group work and the project component of the course. It adds to their analysis by pointing to the problem of understanding faced by students when interpreting course documents. Students' interpretations of their common task varied within a single group. Overall the students interviewed tended to conceive of their task as completing group work rather than in terms of the course content. This was not due to any weakness in the course documentation, which gave clear and detailed advice. It points to a general problem with assessment criteria and documents in general. No document however detailed or clear can provide for the interpretation given to it by a reader. The divergence of understanding did not disrupt the work of the group. The student who held the minority view carried out her task as group co-ordinator in a thorough and efficient manner. Nor did the group's divergent interpretation of their task impact on my assessment of their work. I in my turn had to read and make sense of the assessment criteria. It was no more clear to me than the students where the emphasis lay in terms of content and process.

As a tutor I had to judge whether students had worked collaboratively, but the resources I had in some cases did not include significant exchanges.

Kear and Heap commented that:

> For group work to be marked fairly, the process of collaboration, as well as the end product, should be assessed……. The conference transcript is an invaluable aid in assessing the collaborative process (Kear and Heap p26)

The work outside the conference shows the limits to the evidence provided by the transcript and supports the findings of an earlier place-based study:

> many conferences had a parallel existence in which the public activity of the conference ran alongside private messages either within the conference system itself (using private mail) or outside the conference system using another means of communications. Some of these parallel channels were visible to course tutors often they were only glimpsed fleetingly
> (Jones and Cawood 1998).

The students used ways of communicating outside the conferencing system despite explicit instructions to report all communication within the system and the constraints placed upon the students by the distance nature of the course. Because student activity takes place outside the conference the conference transcript is an unreliable record of learning activity. The students made selective use the network technology provided, moved outside its framework and used a variety of other means to achieve their objectives.

Acknowledgements

This work was part-funded by a grant from the Committee on Awareness, Liaison and Training of JISC (the Joint Information Systems Committee of the UK higher education funding councils). The views expressed here are not necessarily those of JISC or CALT. Further information about the project can be obtained from the project's website (http://csalt.lancs.ac.uk/jisc/). I would like to acknowledge the contributions of other members of the project team: Peter Goodyear, Vivien Hodgson, Christine Steeples, Mireia Asensio, Susan Armitage, Mark Bryson, Michael O'Donoghue and David Hutchison.

References

Entwistle, N.J. and Ramsden, P. (1983). Understanding student learning. London: Croom Helm.

Fleming, W.G. (1986). The interview: a neglected issue in research on student learning. *Higher Education* 15: pp. 547 - 563.

Jones, C. and Cawood, J. (1998). The Unreliable Transcript: Contingent Technology and Informal Practice in Asynchronous Learning Networks. In "Networked Lifelong Learning: Innovative approaches to education and training through the Internet. Proceedings of the 1998 International Conference." 1998, pp 1.9 - 1.14. University of Sheffield, Division of Adult Continuing Education.

Kear, K., and Heap, N. (1999). Technology-supported group work in distance learning. Active Learning. No 10: 21-26.

Marton, F. (1994). Phenomenography. In T.Husen and Postlethwaite, T.N., The International Encyclopedia of Education 2nd Edition. Oxford: Pergamon: 4424 -4429.

Marton, F., and Booth, S. (1997). Learning and Awareness. Mahwah,NJ: Lawrence Erlbaum Associates.

Randall, D., Hughes, J.A., and Schapiro, D. (1994). Using Ethnography to Inform Systems Design. Journal of Intelligent Systems. Vol 4. Nos 1-2: 9 - 27.

Richardson, J.E.T. (1999). The Concepts and Methods of Phenomenographic Research. *Review of Educational Research.*Vol 69, No1, pp. 53 - 82.

Networked Learning for Post-graduate Supervisors

Peter Kandlbinder
Institute for Teaching and Learning
Carslaw Bld, F07
University of Sydney,
NSW 2006 Australia
tel: +61 2 9351 4872
fax: +61 2 9351 4331
email: pkandlbi@ctl.usyd.edu.au

Abstract

The Postgraduate Supervisors Development Program has been delivered on-line since 1998. The success of this program in demonstrating the potential for on-line academic staff development has led the Institute for Teaching and Learning to undertake further on-line initiatives targeting, in the first instance, flexible learning and assessment. This paper discusses the development of this networked learning program in which academic staff are free to arrange their own progression and retrieve resources at any time that suits them and their supervisory responsibilities. It highlights the program's participatory modes of learning that creates an environment in which supervisors can reflect on their own supervision as a basis for understanding their supervisory practice.

Keywords

On-line professional development, postgraduate supervision

Introduction

Many academic development units (ADU) are ambivalent towards the use of on-line technologies for staff development. On the one hand ADUs are at pains to ensure they are driven by pedagogy rather than technology. On the other hand there is the recognition that networked learning has a legitimate role in overcoming the constraints experienced by some academic staff. The Institute for Teaching and Learning (ITL) has used the Internet and on-line learning as a means of delivering academic staff development since 1996. Early examples made use of e-mail and discussion forums with only limited success. The increased acceptance of World-wide Web brought with it an expanded range of offerings for academic staff starting with simple web-based workshops and culminating in a complete development program for postgraduate supervisors delivered by flexible learning.

Many universities now have in place a program of workshops for the development of postgraduate supervision. Most struggle with the implicit nature of supervision which make it difficult to know which approaches work and how to transfer these successful practices to other supervisors' situations. The ITL took a similar approach until 1998 when it partially delivered the Postgraduate Supervisors Development Program on-line. This program's main aim is to raise awareness of the roles and responsibilities of postgraduate supervisors as outlined in the University's "Code of Conduct" (Graduate Studies Committee, 1999). It introduces a range of techniques used by experienced supervisors and demonstrates how these techniques can be integrated into supervisor's own practice.

The disparate nature of postgraduate supervision makes it an ideal case for adopting flexible learning principles in staff development. This paper describes the evolution of a learning environment developed to support supervisors drawing on their own experiences of being supervised, to reflect on their journey to becoming a competent supervisor. The program allows supervisors to choose to complete the program as flexibly as their schedules permitted. Some supervisors complete just the web-based modules, some only attend the workshop program, while others elect for a combination of both.

Postgraduate Supervisors Development Program

The Postgraduate Supervisors' Development Program was always conceived of as more than a collection of links to information. It consists of three inter-related learning environments that involve either web-based materials, workshops or independent study. Access to the web-based resources is through one of three entry points. A "browsing" section is available to anyone interested in postgraduate supervision. It provides an information-rich environment that links supervisors to material about their immediate institutional context, as well as the wider scholarly community writing about supervision pedagogy. In this way it provides both the information required by supervisors and the models necessary for reflecting on supervisory practice. Examples of resources available are the University's Postgraduate Studies Handbook, links to the latest journal and book publications, web sites on postgraduate supervision, links to appropriate higher education reports, links to relevant committees with contact information, and case studies by successful supervisors.

For supervisors who would like to work through the resource material in a more formalised course of study, there are six self-study modules also available on-line. The modules are password protected and require registration into the program to receive access to the materials. Registration involves a brief questionnaire in which supervisors indicate their interests in postgraduate supervision and nominate a date when they would like to be removed from the program's register.

Each of the six modules represents a different stage in the cycle of supervision. One of the most popular modules is "Preparing for Supervision" which discusses negotiating the aims and responsibilities of supervisors as the starting point for supervision. Equally popular is "The End of Year Review" which outlines the institutional requirements for reporting on a candidature and mechanisms for receiving feedback on supervision practices. Supporting these modules is an on-line discussion forum that acts as a central point where participants engage with the web-based materials. It is in this forum that they are able to discuss the activities and trigger questions contained in the self-study materials. The forum also represents the third access point for supervisors just interested in discussing issues related to postgraduate supervision, such as the recent government recommendations for the reform of university research (Kemp, 1999)

The program retains two workshops for supervisors who prefer face-to-face interaction or for those who can not access the on-line modules. The workshops provide an opportunity for supervisors to come together and engage in a dialogue about supervision practice. They also allow supervisors to gauge their own approach to supervising relative to the expectations of the wider university community. To encourage this comparison the workshops in 1999 included presentations from postgraduate students, postgraduate coordinators and examples from successful supervisors recognised in annual teaching awards. Evaluations of the workshops suggested that supervisors' valued the opportunity for cross-disciplinary dialogue. While it might be argued that this facility is available at the web site through a discussion forum, we have come to acknowledge that the environment created by face-to-face interaction provides an intrinsic part of the staff development process. Feedback forms indicated that all supervisors valued the opportunity to engage in discussion with colleagues though supervisors also suggested that more time was needed in the development of a strategic approach to address the individual problems faced by them in their supervision.

Flexible delivery of staff development

From presentations in the workshops it is clear that supervisor's learn from their experiences of their own supervision and reflecting on these experiences. The paths to successful supervision varied from trial and error to working through professional development activities similar to the Postgraduate Supervisors Develop Program. Understanding how supervisors came to be effective has resulted in a gradual change in emphasis for our own program. It is no longer largely about developing techniques and methods for effective supervision. It also raises awareness of the variation in supervisory practice, particularly where supervisors are involved in a process of reflecting on the aims of supervision and applying these principles into practice.

Participants in the program reported that their thinking about supervision had changed as a result of their involvement in the program. They were implementing processes aimed at supporting students such as formalising documentation, negotiating regular meeting times and clarifying the roles and responsibilities with their students. Supervisors negotiated individual learning goals through the registration process where trigger questions assists them to conceptualise their goals, strategies to meet those goals and then to evaluate the effectiveness of their learning about supervision pedagogy. Supervisors' reasons for joining the program ranged from attracting more research students, exploring their roles and responsibilities, managing projects, through to considering their own philosophies underlying their practice. Many participants indicated that they were unclear about 'how' they knew their supervision had improved, which will be addressed in a future module that can be assessed and accredited if the supervisor chooses.

To ensure that the Postgraduate Supervisors Development Program made appropriate use of information technology, participants in the program were asked to comment on their experiences in the program through an email survey. Particularly pertinent were their impressions of utilising on-line technologies for professional development. Supervisors who had attended both the workshops and used the on-line materials could also comment on the congruence between those parts of the program. The program participants responded that the use of technology for professional development allowed them to 'think about the principles of postgraduate supervision outside the workshop format'. It has also permitted a more flexible involvement and a careful selection of resources relevant to their practice. Access to on-line materials meant that resources were conveniently located at a single destination - convenient considering the many demands on academics' time.

The ITL's experience with networked learning demonstrates that flexible delivery of supervision training can provide opportunities for supervisors to think about issues in a sustained manner, at a time convenient to them. This was confirmed in a survey of Postgraduate Coordinators who are responsible for the nature of supervision in their departments. When asked to comment on innovative departmental practice they reported that supervisors had been engaging in more explicit pedagogical practices with their research students. This included collaborating on resource statements, increasing contact hours, negotiating expectations about roles and responsibilities, reinforcing comments made by the program's participants.

Conclusions and future challenges

There have been considerable changes to the program since its move from the traditional face-to-face workshop format to on-line delivery. The combination of the workshops and web-based resources seems to have struck the appropriate balance for the staff development of postgraduate supervisors. The number of supervisors registered to complete the program has almost doubled and the program continues to be successful in attracting its target group of academics new to supervision. For a large part it is the web-based resources that have allowed supervisors to complete the program in their own time, supported by links to other participants.

The move to networked learning has had little impact on who registers for the program. Supervisors in the Faculties of Health Science and Science have consistently represented the largest group of participants throughout the program's history. The program is less successful in attracting the more senior academics who do most of the supervision of postgraduates. While this is a group who do not traditionally participate in staff development activities, the Postgraduate Supervision Development Program provides the best opportunity to collaborate with this influential group of academics.

The primary challenge for the future continues to be how to overcome the time pressures so often mentioned as a limiting factor in staffs' access to the program . Many of the comments regarding both the workshop program and the web-based resources seem to reflect personal preferences for individual learning styles. Supervisors have pointed to the importance of more structure to the on-line discussion forum and strengthening web-based resources by including content of the workshop program. Others have reported that the openness of a program delivered through networked technologies has allowed "thinking about the principles of postgraduate supervision outside the workshop format." Rewarding supervisor's participation in the program will be the strategy that moves the program into its next stage of development.

References

Graduate Studies Committee. (1999). *Postgraduate Studies Handbook*. Sydney: University of Sydney.

Kemp, D. (1999). *New Knowledge, New Opportunities: A Discussion Paper on Higher Education Research and Research Training*. Canberra: AGPS.

Embedding key skills into the curriculum through networked learning: an evaluation of implementation strategies

Helen Keighley and Gabi Diercks-O'Brien, Centre for Access & Lifelong Learning, University of Lincolnshire and Humberside

This paper aims to identify opportunities and barriers surrounding successful technology implementation in Higher Education (HE). The paper incorporates the results of an external evaluation, undertaken by Professor Harold Silver, of the implementation of a networked learning environment (NLE) in six HE institutions as part of the ELEN Project (Extended Learning Environment Network). The evaluation was formative in nature and aimed to recommend how the consortium could enhance the implementation process in the project's second phase. The evaluation was sought as a means to afford all stakeholders the opportunity to make a critical assessment of how successful the implementation of ELEN had been and where improvement was needed. This paper, therefore, provides an overview of and reflection on both the problems experienced and the benefits found by HE staff involved in the project. Although specific to the project, the ELEN experience and the reflections reported herein will be of value to other institutions or technology projects.

The ELEN Project

The Dearing Report identified key skills as central to the future success of graduates and in creating an effective 'learning society'. The Report also argues that the innovative use of information technology can improve the quality, flexibility and effectiveness of HE, in terms both of innovative and flexible subject content delivery and of management and development of the learning environment. (Dearing 1997)

The ELEN Project, funded by HEFCE's national technology initiative the Teaching and Learning Technology Programme (TLTP), aims to address the issues of implementing new technologies and assess the effectiveness of using C&IT to work someway towards addressing the visions of the Dearing Report. The ELEN project focuses on utilising technology to assist student development of both key skills and subject-based knowledge to identify best practice for implementation and investigate student and staff interaction with technology. Phase one of ELEN concentrated on the integration of on-line key skills resources into the curriculum using a NLE, the *Virtual Campus*. Phase two of the project will concentrate on embedding resources in a variety of electronic formats to assist in developing students' subject knowledge.

Approach to evaluation

The introduction of NLEs into the curriculum, like any other innovation, succeeds or fails on implementation. It is therefore important that all factors which create opportunities for, or barriers to, change are addressed. There are no magic recipes for successful implementation – what proves to be a successful strategy for one institution may fail in another and formative evaluation is a powerful tool to identify the origins of implementation issues. Many of the ELEN evaluation findings are in accordance with the results of a study undertaken at the University of Canberra, which identified the factors contributing to successful implementation with regard to 104 technology projects. (Alexander *et al.* 1998) Previous investigations into the implementation process of technology such as this, however, have often centred on one institution or aspect, such as staff training provision (Alexander 1999), whereas ELEN provides an opportunity to transcend site-specific innovations and make global statements about technology implementation.

The evaluation approach was based on a belief that implementation should be both systematic and supported. Therefore, the evaluation needed to investigate the following (based on an application of the 'Managing Change Model' (Ford *et al.* 1996):

- Did the objectives of the institution support implementation?
- Did the existing infrastructure of the institution facilitate implementation?
- Did the structures and the key individuals of the organisation support implementation?
- Did the processes initiated to manage implementation succeed?

The evaluation was anonymised to allow staff to be open about their experiences. The report focuses on areas of difficulties experienced by staff, as well as their successes, in order for the project to critically assess and enhance the implementation process in the second phase. The report is of a qualitative nature and therefore emphasises detail rather than statistics and issues raised are generally representative of all institutions unless otherwise stated.

The following data is drawn from:

- semi-structured interviews at each institution with project managers and senior university managers (steering group member);
- two focus groups with 6 project leaders each (12 out of 22 accepted the invitation);
- 3 out of 6 questionnaires to a senior person in computer services in each of the institutions;
- 5 out of 6 questionnaires to campus managers;
- 11 out of 22 questionnaires to project leaders;
- university and project documentation.

Motivations for using networked technology for key skills delivery

The common institution motivation for joining the project began with an interest in utilising the Effective Learning Programme (ELP), a skills programme complete with on-line resources, and the *Virtual Campus*, both developed and successfully implemented at ULH. However, individual and institutional motivations differed and these included:

- ELEN seemed relevant to improving the delivery of key skills at a significant moment in policy development and implementation and was seen as a "selling point for recruitment";
- ELP and the *Virtual Campus* seemed ideal and served multiple aspirations for staff to utilise what was believed to be a "tried and tested" system;
- ELEN was seen as an opportunity to extend activities in on-line development and investigations into NLEs; and as a chance to experiment with technology;
- CAL was seen to enhance the student learning experience;
- staff feared marginalisation if the institution did not get involved in using technology to support learning;
- staff were attracted to the ELEN project because they either knew the ULH project director or had seen a presentation of ELP and the *Virtual Campus*.

Other investigations with regard to institution's and individuals' motivations for uptake of NLEs have suggested external and internal pressures (competitiveness, student numbers, curriculum change) to be the main drive rather than a real commitment to improving learning outcomes (Oliver 1999), and ELEN is no exception.

Barriers to implementation

The results of the evaluation of phase one have revealed that there are many barriers to the successful implementation of technology that are common across the consortium, including: lack of staff time; infrastructures that were not developed or prepared for technological innovation; local administrative difficulties; and project difficulties in supporting training. Although the focus of the ELEN evaluation was wide ranging, for the purposes of this paper three main areas will be focussed on, namely, technical issues, roles and responsibilities and institutional contexts.

Technical problems

ELEN suffered a series of unforeseen technical issues in the first year of the project. Although this is to be expected when using new technologies, transferring a seemingly reliable NLE to other institutions proved problematic and this played a crucial role in the successful and timely introduction of the technology. The main issues were:

- lack of appreciation of the differences in technical infrastructures and the technical processes required to set up the system elsewhere;
- lack of appreciation of the willingness, or ability, of local technical staff to set up the system and resolve local issues;
- technical staff were not always informed early enough, or in enough detail, about what would be expected of them or the local network systems;
- local system problems, for example, where institutional networks were not robust or advanced enough to run the technology.

These issues were also exacerbated by the privatisation of the *Virtual Campus* mid way through phase one which led to on going and unexpected system developments and a change in the technical support structure.

Staff were very positive about the contribution of web-based learning to key skills development, although many had unrealistically high expectations of the use of an NLE. The *Virtual Campus* and ELP resources were seen "as god's gift to key skills" which perhaps explains some of the disappointment staff felt when technical problems arose and they began to realise how complex the installation of technology and the training of users and authors was.

The degree of technical problems encountered by staff severely affected the achievements of the first phase of the project and influenced the attitudes of staff both to their own project work and ELEN at large. However, it is also significant to note that despite the technical issues staff saw such promise in the technology and their personal learning experiences gained from working with it that they continued to develop their projects.

Roles and Responsibilities

Staff believed that although institutions supported their work in dealing with both technology and key skills in principle this was not always true in practice. Some staff teams worked in relative isolation within their institution and in such cases the consortium provided much needed practical and moral support. The lack of real institutional support manifested itself in a lack of staff time. Staff were attempting to manage or develop projects over and above their usual workloads and the lack of time often meant local managers did not have sufficient time to monitor projects, teaching staff did not have time to trial projects sufficiently or in good time and technical support and training was provided *ad hoc* and only when asked for. Training manuals provided by the *Virtual Campus* provider were found to be inappropriate and the lead site also made mistaken assumptions about the technical skill levels of the staff using the technology.

It is clear, therefore, that a key to successful implementation is staff having both the time and necessary skill sets to undertake the required work and absence of these proved to be a universal barrier. It has, however, provided the institutions with an opportunity to assess the roles and skill levels of staff and also begin to develop the necessary support infrastructures. Teaching and learning with new technology requires a reassessment of the roles and responsibilities of both teaching and support staff and a reassessment of roles inevitably requires staff development. Providing effective training is also, therefore, a crucial factor in equipping staff with the skills to utilise new technologies.

Institutional contexts

The context of individual projects and institutions varied widely with regard to scale, nature and purpose of the implementation. Differences existed in student numbers, institutional structures, expectations, roles of project managers and the nature and extent of support from senior management or technical services.

Although it takes time to understand the cultural differences between institutions in order to fully appreciate the different approaches taken to key skills and technology implementation (Hobbs 1999), it was apparent that, in many of universities, there was no clear objectives for the provision of key skills or the use of NLEs and hence no infrastructures to support the work with technology. There were also differences in relation to attitudes and provisions for key skills development. On one hand, skills were accepted as an integral part of a module or course. On the other, some institutions or staff believed that skills should remain outside of subject modules. A lack of systematic approach either at institutional or departmental level could affect the outcome not only of the projects but of the success of the individual courses.

Both the successes and the difficulties faced in the first phase of ELEN, were somewhat rooted in the motivations for signing up to the project and in the starting point of each institution. These affected the definition of roles and responsibilities within the institution, perceptions of ELEN, the contexts in which ELEN was introduced to the staff and approaches to implementation. Where there was confusion over these or a lack of clear direction, the processes was impeded but the project has offered an opportunity to reassess the institutional context and in at least one institution the work and outcomes of ELEN have been incorporated into their new Teaching and Learning Strategy.

Perceived benefits for stakeholders

Regardless of the barriers faced by staff in implementing the technology, staff did perceive real benefits to implementing NLEs to deliver key skills both for themselves, their students and the institution:

- Students
  - ELEN was seen as a means for students to acquire key skills more easily;
  - students would be using IT to access resources and thus developing their IT skills;

- Staff
  - curriculum change and skills introduction was a motivator to staff;
  - ELEN provided a supported environment through the consortium and provided contacts with other likeminded staff;
  - ELEN seemed like the ideal tool for an easy solution to increased workloads or student numbers;
  - opportunity to test ELEN against other platforms;

- Institutions
    - those who had background knowledge about technology had clear notions about ELEN and thought that it could make the learning experience more interesting;
    - ELEN provided a means of teaching with new methods which they believed would attract students;
    - institutions felt that ELEN kept them in line with new technological developments in teaching.

Reflections

It is clear that the introduction of technology into a HE setting is problematic and complex, especially when undertaken by academic innovators rather than as an institutional initiative.

Where staff did not have effective support within the institution, as was true in some cases, or where staff felt isolated or out of their depth with technical issues some projects were reduced in scope and so it is clear that managing the actual support process of implementation is crucial to the success of the introduction of technology. Staff, however, have developed new skills and awareness and also accepted that experiencing and overcoming problems is part of the learning process and adopted a longer term vision for perceived benefits.

Positive outcomes are already apparent within the project, for example, a heightened awareness of educational technology issues and the need for careful project planning and trialling have been seen in new phase two projects. Institutional managers are also now providing more targeted support for projects. Although it would be premature to expect major departmental change as a result of an individual project, let alone institutional change, a pilot project such as ELEN can make significant comment on the changes to infrastructures and roles needed in order to implement technology institutionally or departmentally.

ELEN has identified a number of direct positive outcomes from the experiences of phase one:

- staff have a greater awareness of the necessity of systematic approaches to implementing technology;
- staff have identified communication frameworks as crucial, especially with technical staff;
- senior management have felt pressured to smooth the process of implementation;
- communication with technical staff has increased and in several cases additional posts have been created with funds made available for technical support and "implementation" staff;
- institutions have developed a greater awareness of other technology initiatives and have developed an orientation towards partnerships;
- the project team have identified training in the use of technology as crucial to the success of academic staff embedding technology into learning;
- in working as a consortium, staff have gained from each other's expertise and experiences;
- institutions have assessed the advantages and disadvantages of other NLEs, clearly an indicator for a growing commitment towards institutional change.

Best practice in implementing technology projects

The ELEN evaluation has revealed a number of issues central to the successful implementation of NLEs in any HE institution, regardless of status, politics or organisational structure. The following are ELEN's five main recommendations for best practice in implementing NLEs:

1. staff must be made aware of the potential, but also the limitations, of technology and staff must feel some level of ownership;
2. staff development is crucial to not only introduce people to the practicalities but also to the new pedagogies behind using networked technology effectively;
3. institutions should establish appropriate infrastructures to ensure effective communication between key staff and to ensure adequate support for both staff and students;
4. staff must be allocated real time to work on developing new teaching methods and also have the time and resources to trial and pilot them sufficiently before use;
5. senior management must show support to staff using new technology through recognition and reward of teaching innovations and development work.

The main conclusion of ELEN, however, is that although projects of this nature are an immense opportunity for universities to allow staff to explore new ways of teaching with NLEs, senior management should accept that it is impossible to seamlessly embed such technologies and embed technology effectively real resources and real time must be made available to staff and supporting infrastructures must be in place to assist the integration and use of technology. (Alexander et al. 1998, Buckner & Stoner 1996)

References

Alexander, S., McKenzie, J. & Geissinger, H. (1998). *An Evaluation of Information Technology Projects for University Learning.* (Executive Summary). University of Canberra.

Alexander, W. (1999). *TALiSMAN Review of staff development courses and materials for C&IT in teaching, learning and assessment.* (Summary Report). Heriot-Watt University.

Buckner, K. and Stoner, G. (1996). Practical implementation issues, in Stoner, G. (Ed.) (1996). *LTDI. Implementing Learning Technology.* Heriot-Watt University, 41-45.

Committee of Scottish University Principals (1992). *Teaching and Learning in an Expanding Higher Education System.* ('The MacFarlane Report'). Edinburgh: SCFC.

Dearing, R. (1997). *Report of the National Committee of Enquiry into Higher Education.* HMSO.

Ford, P., Goodyear, P., Heseltine, R., Lewis, R., Darby, J., Graves, J., Satorius, P., Harwood, D. & King, T. (1996). *Managing Change in Higher Education. A Learning Environment Architecture.* SRHE & OU: Buckingham.

Fullan, M.G. (1982). *The Meaning of Educational Change.* New York: Teachers College Press.

Higher Education Funding Council for England (1999). *Use of TLTP Materials in UK Higher Education.* (HEFCE Report). June 99/39.

Oliver, R. (1999). Exploring strategies for on-line teaching and learning. *Distance Education,* 20 (2), 240-254.

Richardson, J. (1996). *Changing Courses - Strategies for Changing the HE Learning Environment.* Open Learning Foundation.

Silver, H. (2000) *ELEN: An Evaluation Report.* (Unpublished Report). University of Lincolnshire and Humberside.

Stoner, G. (Ed.) (1996). *LTDI. Implementing Learning Technology.* Heriot-Watt University.

Hobbs, S. (1999). Confounded cultures: the role of evaluators in identifying conflicting expectations in inter-institutional projects, in Oliver, M. (Ed.) (1999) *The Evaluation of Learning Technology*. (Conference Proceedings). University of London, 23-26. http://www.unl.ac.uk/tltc/elt/#reports

Project Work in Networked Distance Education

Morten Knudsen, Jan Helbo, Lars Peter Jensen, Ole Rokkjær, Ole Borch and Jørgen Østergaard
Department of Control Engineering
Aalborg University, Denmark

Abstract: Project organized problem based learning is a successful concept for on-campus education at Aalborg University. Recently it has been the basis in networked distance education as well. This paper describes the experiences of Internet-mediated project work in a new Master of Industrial Information Technology education. For a pilot project, each student group prepared a report, evaluating the collaborative work process, and these process reports combined with the teachers observations, comprise the background material. The main conclusions are, that the project work was a strong learning motivator, enhancing peer collaboration, and that networked communication and face-to-face meetings was an efficient combination.

Keywords: Distance education, collaborative learning, problem based learning, group organized project work, Internet.

1. Introduction

Project organized problem based learning has been the foundation for the educational system at Aalborg University from its start 25 years ago. Since then, experience has proven this a very successful innovation in higher education [Kjærsdam and Enemark, 1994; Fink, 1999]. The duration of each student project is one semester, and the students spend half of their time working on the project in groups of typically 5-6 persons. In the engineering education a major part of the projects, especially in later semesters are part of research projects or industrial projects. This learning concept has many merits, e.g. increased motivation, excellent development of analytical skills, and experience in coping with complex real-life problems.

Consequently, it seems to be an obvious idea also to base our distance educations on the project study form. Traditionally, however, distance education has been characterized by one-way communication and self-study, whereas the project study form is based on collaboration and dialogue. Thus, a successful implementation of project work in distance education requires extensive utilisation of new information and communication technology.

A thorough literature search has only revealed a limited number of references on project-organized learning in networked distance education [Fowel and Levy, 1995; Milbury, 1998; Stamps, 1999; Whittington and Sclater, 1998]. The anthology [Danielsen, 1999] (in Danish) gives an excellent overview over learning theories in networked education, and [Bygholm et al, 1998; Brandon and Hollingshead, 1999] report and evaluate relevant cases.

In this paper the experiences of Internet-mediated project work in a new distance education is described. The project groups communicated by:

- Document exchange via web
- Asynchronous communication using e-mail and discussion fora
- Synchronous communication using chat fora
- Face-to-face meetings during seminars

For a pilot project, each group prepared a report, evaluating the collaborative work process, and these process reports combined with the teachers observations, comprise the background for this paper.

2. The Master of Information Technology Education

The Master of Information Technology Education in IT Engineering (MII) is a new supplementary education, established by the Institute of Electronic Systems at Aalborg University, Denmark. URL: ***http://www.mi.itorg.auc.dk.***

The MII differs from the regular M.Sc. E.E. and B.Sc. E.E. educations in several ways, as the students:

- Already hold at least a bachelors degree or equivalent
- Are employed
- Have almost no spare time for studying
- Want to work innovatively with information technology in their professional life
- Have varying level of IT-skills (from IT professional to IT novice)
- Constitute an inhomogeneous group of people, regarding:
    - Age (25 – 56 years)
    - Former education (B.Sc. in Electronics Engineering, Mechanical Engineering, Building Construction, Architects, School teachers and others)
    - Residence (from most parts of Denmark)
    - Professional career

The MII is an Open University education, which implies a payment of study fees (app. £ 2000 per year) and it takes three years of studying on a part-time basis (approximately 20 hours per week) to acquire the Master of IT title.

Content

The MII education leads to one of 5 professional specializations, sharing a common first year education. The contents of this year are primarily basic theories and skills in: Data Networking, Object Oriented System Development, the Client-Server paradigm, Databases, Human Computer Interaction and Web-tools.

The second and third year the students are studying IT concerning their own profession, attending courses of particular interest and making projects about the chosen subject of special study. The MII offers specializations in:

- IT in the Building Process
- IT in Industrial Manufacture
- IT in Control Engineering
- IT in Distributed Real Time Systems
- IT Network Maintenance

The pedagogical model in practical studying

It has been the aim to transfer the successful Aalborg model to a modern supplementary IT education and adapt the main points of the model to networked distance learning at the MII education.

The major difference, compared to pure distance education, is the study seminars. They serve the purpose to support the courses and the project work, in introducing and boosting the courses, and in scheduling time for project work and reflections. The study seminars also contribute to establish an identity as a student and social relationships between the students.

3. Pilot Project

It has proven a good idea to start problem-based educations with project work by letting the students make a short pilot project in administratively selected groups. This seems also to be the case in distance education [Bygholm et al, 1997], so it was chosen to begin the MII-study with a pilot project, titled:

Make a Web site for your group, to present your projects and the group members

The objective was to get experience with project and group work in distance education, and to test relevant communication tools.

Learning approach

One of the views about problem-based learning in groups making a project, is that reflection loops have a predominant place. This understanding of learning processes is based on Kolb's (1984) learning cycle, and Schön's (1987) ideas about reflection in the learning process, combined by John Cowan (1998) to a learning concept based on several small reflection loops - Kolb cycles (as paraphrased by Cowan: - experience - reflection - generalisation - test -) and planned reflection three times in a learning process, see Fig. 1: before (*for*) or in the very beginning of the learning process where it is considered what the process shall be to fulfil the learning needs, *in* the middle of the process, where it is considered how the process so far has fulfilled the scopes and aims, whether they are still relevant and what changes in plans if any are necessary, and finally after (*on*) the learning process, in order to decide what has been accomplished and what is still missing, bearing in mind improvement of future learning processes.

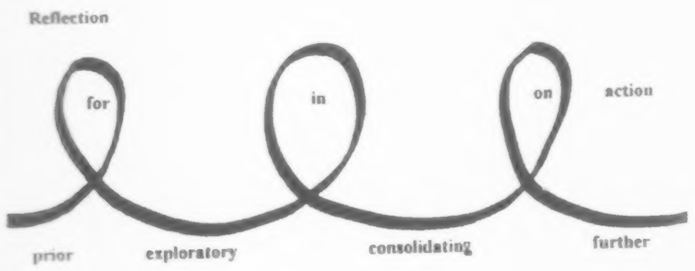


Figure 1: The Cowan diagram. [Cowan, 1998].

One of the main purposes using this approach with three reflection loops is to teach the participants to improve the quality, depth and relevance of what has been learned.

Form

The pilot project was started at a seminar (2½ day) and run for 2 month, with a seminar in the middle and an evaluation seminar at the end.

A crucial course: "The virtual workplace" about both communication tools (IT) for the virtual work and for face-to-face collaboration were held at the seminars. At each seminar there was time for actual project work, and according to the learning approach this was guided by reflections. At the starting seminar the groups reflected about the content and purpose of their Web site, resulting in a written problem formulation for the pilot project. In the middle of the project period they reflected upon their virtual workplace and the project work done so far, in order to improve communication and to modify their plans to be sure to finish their project in time. For evaluation purpose at the final seminar each group had made 3 documentation products: A Web-site, a project report documenting and evaluating the Web site (specification, design, implementation, conclusion and documentation) and finally a process report reflecting about how they could improve their group work in the next project.

The process report was used for the final reflection on the learning process, during the evaluation of the projects, and it appeared to be a powerful tool, not only for making good advices for the next project, but also for documenting the experiences with project work in distance education, used in this paper.

4. Technology and Collaboration Methods

In the MII education the latest information and communication technology is the subject as well as the tool.

LUVIT® is an integrated distributed WWW-based learning environment, originally developed at Lund University, Sweden. It has facilities for development and delivery of on-line courses, and provision for statistical information of student activity. Although it is not intended for project work, it was chosen for the MII-education, as the course facilities appeared to be adequate for group organized distance collaboration in project work as well. A project work is handled as a course, where the students are the information providers.

Document handling

The project documents are organized in a tree structure in LUVIT, reflecting the final report contents, see Fig. 2, [Borch et. al. 1999].

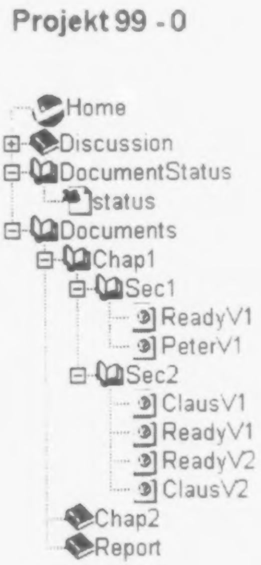
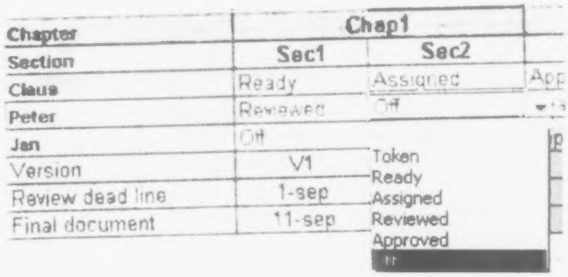


Figure 2. LUVIT navigation tree: documents for group 0.



Chapter	Chap1	
Section	Sec1	Sec2
Claus	Ready	Assigned
Peter	Reviewed	Off
Jan	Off	
Version	V1	
Review dead line	1-sep	
Final document	11-sep	

Figure 3. Section of spreadsheet status document, Project with pull down menu of possible selections opened.

The documents are typically Word documents, and the reviewing facilities, 'track changes' and 'comments' are utilized. To organize the document handling, a status document, implemented as a spreadsheet, is used. The status document, Fig. 3, contains the status of each document, including version control, and the related responsibilities of each group member. The status document is downloaded, modified and uploaded to LUVIT, recording every action on a document.

Asynchronous communication

LUVIT has a discussion forum organized in threads. Besides, ordinary e-mail is used for communication between group members and supervisor.

BEST COPY AVAILABLE

Synchronous communication

LUVIT also provides a chat forum. Typically, chat meetings have been conducted once a week per group, the group supervisor participating if convenient and desired by the group. The duration of a chat meeting is typically 1 hour, but the efficiency is low due to context mix-up and typing delay. Using MS Netmeeting, the sound facility and immediate file transfer possibility is an improvement.

Face-to-face meetings

These meetings, held at the seminars, were utilized for fundamental discussions and decisions in the project work such as status, planning and reflection.

In some cases, e.g. when the computer technology failed, the telephone or fax was used.

5. Experiences with the Pilot Project

Experience with problem oriented group work in distance learning will be presented as: distance group work experiences, project work experiences, technology experiences, and seminar experiences.

Distance group work experiences

The students are faced with many kinds of problems, social as well as professional, to get the group work done properly. It was a special challenge to give the project precedence, because it is much easier to use time for well planned discipline oriented courses where progress is easy to measure and where hints are available. At the same time, group work copes with unclear task/subtask definitions and the students are mutually dependent. In the virtual group room the students communicate through chat, telephone (synchronous), e-mail and fax (asynchronous). Experiences from virtual group room work can be handed over by comments from the groups:

Problems: "Chats are very time consuming (2 hours or more) and difficult to structure. Often group members 'speak all at ones' about different subjects and even about matters that do not belong to the subject under discussion"

Best practice: Before every chat meeting one of the group members was responsible for making a detailed agenda for distribution to the other group members via e-mail. The agenda also pointed out a chairman and a reporter. Every topic had its own unique topic-number. It was the chairman and only the chairman that changed from one topic to the next. The chairman was responsible for closing and saving the discussion.

Benefits: It was agreed that regular chats so far are necessary and could be used with success in group work. It was time consuming but gave the students the feeling of group solidarity.

It seems that chat was not suitable for difficult and complex problems. These kinds of problems were treated in a superficial way. Chat was best for communication in firm frames and requires high discipline from the participants.

Project work experiences

The Project work dealt with description of well defined tasks/subtasks, task planning and time planning. The groups as self running entities really had problems with defining common plans, so that every student was confident with the plan and knew all about tasks/subtasks and when they were supposed to be solved.

Problems: "In retrospect, it is easy to see that the time plan was not used seriously enough. The time plan was not under debate on every chat. Suddenly subtasks were behind schedule and the time lack did not result in a revision of the time plan. There should be much more attention to the relation between the time plan and state of the project."

Best practice: An analysis in the beginning of the project period should give an overview of the whole project compared to an estimated need of time. It was followed with detailed subtask definitions and a detailed time plan. The time plan was always a topic in the agenda.

Benefits: Most of the students were very enthusiastic and enjoyed working on solutions of the problem together.

Project work in the virtual space, though, was very individual. As stated in a report: "The project phase can be hard and lonely for the individual student, where doubt and uncertainty for the project solution and the other members of the group are strong factors".

Technology experiences

Virtual group work is dependent on: communication, exchange of documents, version control of documents and track keeping of the time planning.

Communication was mainly done via chats. In LUVIT the students can create as many chats and forums as they wanted, but this was one of the pitfalls because it was very difficult to have an overview of more than a few.

Exchange of documents and version control (Fig.2) *and time planning* (Fig.3): When used on the local area net at Aalborg University it worked nicely and as expected, but the experience when used on the Internet revealed lack of robustness. Especially the spreadsheet status and version control system did not work well within LUVIT when used on the Internet, but the ideas are sound and well defined and the option really should be available for the students.

Best practice and benefits: The students found other ways to keep track of their documents using Web-drives, Frontpage or common drives at Aalborg University. E-mail was used intensively.

Seminar experiences

The seminars were very popular. The students really felt that the project progressed even if only few hours were free from courses. Especially for the complex and difficult part of the project, where important decisions should be made, face-to-face group work was needed. Also it was observed that the project managing had a very high priority and that the sessions were used as milestones for the project state.
Students comment: "It is important that chats are followed up with meetings at the seminars".

6. Conclusion

For the MII-students, who are not accustomed to project work in learning or to distance learning, a small-scale design-oriented pilot project was an excellent introduction to project work in networked education.
The main conclusions, based on experiences from the pilot project, are:

- *Project work is a unique learning motivator*
  This is particularly important for distance learners, studying at home after a long days work.
- *Project work enhance peer collaboration*
  Studying at home alone may be hard and lonely, and one often gets stuck in even minor problems. Collaboration may be the answer and the way to get forward.
- *Face-to-interface meetings must be combined with face-to-face meeting*
  It is commonly felt, that a good networked collaboration requires a prior personal acquaintance. Besides, the students experienced, that certain parts of the project work, in particular planning and reflection, was much easier accomplished during meetings at the seminar. This may, however, be a matter of culture, habit and technology available. When, in the next project, sound and video will be available for chat meetings, these views may change.
- *Virtual group meetings require a strict planning and control.*
  In chat meetings, informal meeting behaviour is not adequate, but with strict planning and control, they are a useful supplement to asynchronous communication. With sound and video, initial trials indicate that virtual meetings are more efficient and easier to control.

Acknowledgement

We thank the students of MII 1999 for their excellent process reports, and for letting us use them in this publication.

References

- Borch O., Knudsen M., Helbo J.: From Classroom Teaching to Remote Teaching. EURO Education Conference 2000, Aalborg Denmark, Feb. 2000.
- Brandon D.P. and Hollingshead A.B.: Collaborative learning and computer-supported groups. Communication Education, Vol.48 no.2, Annandale, 1999. http://proquest.umi.com/pqdweb
- Bygholm A. Hejlesen O. and Nøhr C.: Problem oriented Project work in a distance education program in health informatics, MIDINFO 98, IMIA, Amsterdamm, IOS Press, 1998.
- Bygholm A, Dirckinck-Holmfeld L: Pedagogic in the virtual learning environment (In Danish), from [Danielsen, 1997].
- Cowan, J: On Becoming an Innovative University Teacher - Reflection in Action. London: SRHE and Open University Press, 1998.
- Danielsen O. (Ed.): Learning and Multimedia (In Danish), Aalborg Universitetsforlag, 1997.
- Fink F.K.: Integration of Engineering Practice into Curriculum, 29th ASEE/IEEE Frontiers in Education Conference, San Juan, Puerto Rico, 1999.
- Fowel S.P. and Levy P: Computer-mediated communication in the information curriculum: an initiative in computer-supported collaborative learning. Education for Information 13, IOS Press 1995.
- Kjærsdam F. and Enemark S.: The Aalborg Experiment – Project innovation in university education, Aalborg University Press, 1994 http://www.teknat.auc.dk/teknat_home/experiment/
- Kolb, D. A.: Experimental Learning. Experience as the Source of Learning and Development. USA: Prentice-Hall, Inc, 1984.
- Milbury P.: Problem-based learning, primary sources, and information literacy. Multimedia Schools, Vol.5 no.4, Wilton, 1998. http://proquest.umi.com/pqdweb

- Schön, D.A.: Educating the Reflective Practioner. Toward a New Design for Teaching and Learning in the Professions. Jossey-Bass Publishers, 1987.
- Stamps D.: My anonymous adventures in cyberspace. Training, Vol.36 no.4 Minneapolis, 1999. http://proquest.umi.com/pqdweb
- Whittington C.D. and Sclater N.: Building and testing a virtual University. Computers Educ. Vol.30 Nos. 1/2, Elsevier Science Ltd. 1998.

Talk to me!

Real-time audio-conferencing and the changing roles of the teacher and the learner in a 24/7 environment.

Markus Kötter & Lesley Shield

1. Introduction

The model of distance learning in which Open University [OU] language learners take part is the 'traditional' one for the OU – print, video, audio and face-to-face tutorials. However, since the presentation of its first language course in 1995, the Centre for Modern Languages [CML] has actively investigated alternative means for the provision of language teaching and learning. This paper describes the projects undertaken over the past five years with a particular focus on the most recent studies, the Fluent Project [The establishment of a Framework for Language Use in Environments embedded in New Technologies] which used synchronous voice-over-Internet conferencing with learners of French and German and recent trials with Lyceum, an integrated audiographics package. We briefly discuss the role of the tutor in such virtual learning environments [VLEs] and we summarise learner responses and learning outcomes. Data collected include copies of student e-mail, audio recordings of the individual scheduled sessions, tutor observations and learner feedback obtained through a series of questionnaires.

2. Telephone conferencing

Learning languages at a distance is problematic in terms of practising speaking and listening skills, since learners work mainly at home, on their own. While students of OU language courses are offered up to 21 hours per year of face-to-face tutorials, feedback suggests that most would like increased opportunities to practise speaking and listening in the target language. From 1995-1997, then, to address this need, researchers at the CML pilot tested telephone conferencing for students who were unable or unwilling to attend their regular tutorials.

In 1997, the learning environment was expanded to include e-mail as well as telephone conferencing. This development provided learners with a tool which allowed them to work with each other between telephone conferences. Six to eight learners participated in three activities which required them to collaborate in order to reach a joint outcome. Each activity began with an introductory telephone conference during which students received details of their task and concluded with a second telephone conference in which the learning outcomes were presented. In the interim period, learners were asked to communicate with each other and with their tutors via e-mail to prepare their final session.

It was found that, compared to telephone conferencing without e-mail support, the rehearsal of contributions allowed by e-mail improved the output in the final session in terms of students' fluency and confidence as well as with regard to their ability to ask questions, to request clarification and to express disagreement (Stevens & Hewer 1998). Results of this study also suggest, however, that some learners initially lacked spontaneity or prepared contributions to the extent that they read out answers rather than taking the risks involved in real time interactions.

3. The Fluent Project

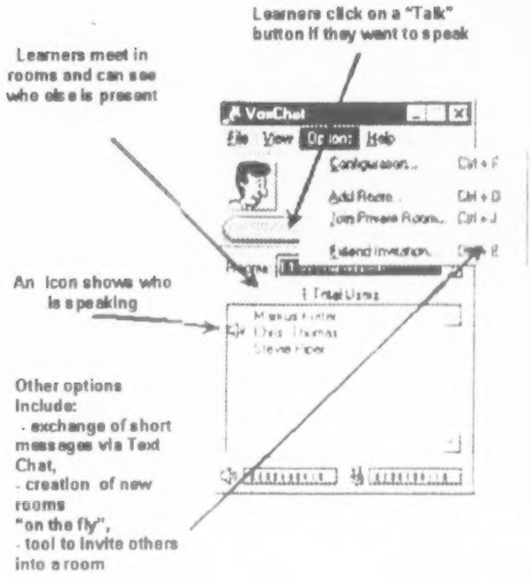
By 1998, the increased robustness of Internet audio technology allowed more flexibility in terms of synchronous collaboration than does telephone conferencing (facilities are available on a 24/7 basis and need not be booked in advance), and two pilot studies were set up in 1998 and 1999 using voice-over-Internet applications. It was hypothesised that factors affecting learner behaviour in telephone conferencing would resurface in the new, Internet-based environment, but that its increased flexibility would reduce students' reluctance to take risks during scheduled learning events, since they would be able to practise their speaking skills at any time they and their peers could arrange to be online together between those events.. Moreover, it was assumed that the richer learning environment and its greater availability would not only foster learners' fluency and their re-cycling of previously acquired vocabulary and structures in new settings, but that it would further improve the learning experience as, unlike the learning environments previously offered, students could meet at times appropriate to their own needs and even form real time self-help groups.

From October 1998 to January 1999 and from March to June 1999, a total of seventy-five students met once a week with their tutor in one of nine groups in order to collaborate on three learning activities. The first phase of this study took place in between the OU's academic years (October-January) while the second phase ran alongside learners' regular course work (February-March). Students were recruited from the first-level German course and from the final French course. The former course requires a target language competence roughly equivalent to O-level or GCSE while by the end of the latter, students will have reached a level of proficiency corresponding to what they would have achieved after two years of language studies at a campus university.

3.1 The Fluent learning environment

Learners participating in the Fluent project had access to:

- *VoxChat*, an Internet-based audio-conferencing client with a text chat facility
- a dedicated website
- e-mail.



Learners click on a "Talk" button if they want to speak

Learners meet in rooms and can see who else is present

An icon shows who is speaking

Other options include:
- exchange of short messages via Text Chat,
- creation of new rooms "on the fly",
- tool to invite others into a room

Figure 1: The VoxChat client

E-mail was included to enable tutors and learners to arrange meetings and to exchange drafts, notes or other information while the website was used to provide learners with information about activities, partners' e-mail addresses and technical help. Finally, as shown in Figure 1, *VoxChat* was chosen because it offers a several options which are not available in telephone conferencing; users can "see" who is talking and who else is using the same room, they can 'branch out' into new rooms, exchange brief text chat messages with each other, and they can call for help or assistance by inviting other users to join them whenever they want.

3.2 Learner experience

Data from student questionnaires, in which the qualitative learning experience was investigated, show that participants particularly liked *VoxChat*'s speaker icon. Several learners expressly welcomed the fact that the software allowed them "to see who it is who is speaking" and that it was easier to respond to individual members of their group. But students commented on other issues, too. For example, many learners claimed that the reduced amount of visual support such as facial expressions and gestures made it more difficult for them to determine if another student had finished speaking. Moreover, they asserted that the use of the audio client forced them to concentrate much harder on what was being said than in a face-to-face setting. Although a knock-on result of this focusing of learners' attention was that, as one learner phrased it, there was "possibly less chance of being side tracked", students were divided in their opinion as concerns the desirability of this effect. Some felt that the implicit anonymity of the medium made it easier to contribute while others claimed that their oral performance was better in a face to face setting.

Tools such as VoxChat require different turn-taking routines from those applying to face-to-face and even to telephone conversations because they require users to click on the "Talk" button before their speech can be transmitted. Students therefore had to take an additional step before they could make themselves heard. As this made it more difficult to use oral back channel cues such as "uhm" or "yeah" to signal agreement or disagreement without interrupting the flow of the conversation, learners received less, and often retarded, feedback from their peers. In sum, like telephone conferencing, many students were— at least initially— more apprehensive than in a face-to-face environment and there were, at first, considerable gaps when, as students put it, "people were wondering whether to speak or not". However, the length of these pauses decreased as learners became more used to the environment and debates became gradually more lively and animated.

3.3 Use of e-mail

Most tasks required students to meet at least once per week between their tutorials in order to collaborate further on activities which required them for example to jointly come up with solutions for traffic problems in a German town or to prepare a feature for a fictitious radio programme. It was anticipated that students would communicate extensively via e-mail between their scheduled sessions and that they would also hold additional audio sessions. In sum, it was expected that the outline of the project would lead to a substantial increase in students' use of the target language, thus helping students to become more fluent, more proficient, and more confident in their use of the target language.

Project data confirm that more than 60% of the project participants collaborated with each other in writing. This figure even went up to as much as 100% in the spring project during the second German activity and the third French activity. A comparison of the number of students who sent and received e-mail from their peers in the course of the projects and the overall figures of attendance further shows that participants utilised e-mail to circulate drafts of project-related written work amongst members of their group, to arrange and remind each other of on-line meetings and to apologise for absences and to exchange personal information.

Students did not receive instructions about which language to use for their e-mail communication. Yet, about two thirds of the e-mail messages exchanged among French students as well as among the linguistically less advanced learners of German were written in the target language. In addition, even those students of French who used English in their messages generally acknowledged that they were not using French.

> *I'm sorry this is in English but I'm short of time and want my message to be clear.*
>
> *Firstly, if you both agree I'd like to spend a few minutes tomorrow speaking in English just to confirm that the software has been proerly adjusted. ...*
>
> *If Martha could give us the benefit of her experience, initialy in English, it may make the rest of the task easier. ...*
>
> (Final level French student)

It seems, then, that, in e-mail messages at least, students were indeed prepared to take risks, acknowledging that it was more important on this occasion to practise the use of the target language than to compose an error-free message

> *Ich danke Ihnen fuer das (?) e-mail.*
>
> *Ich habe auch ein paar Vorschlaege, das wir am Samstag betrachten koenten.*
>
> *(How do you make the umlauts work in e-mail?)* (First level German student)

3.4 Use of the audio client

Learners from each phase of the project could attend between ten and twelve weekly tutored sessions and they were free to hold as many additional meetings amongst themselves as they wished. Tutored events usually began with a brief 'sound check' to ensure that all participants were properly connected to the server. While learners continued to arrive, students and their tutor both engaged in social maintenance conversation (Murray 1991) and discussed matters concerning the actual project work. After five to ten minutes, learners went to different virtual 'rooms' and either continued to work in groups for the rest of the session or reconvened – being called back to plenary by their tutor - for a short de-briefing. In a final session for an activity, however, students and their tutor would stay together in one room for the whole meeting.

A preliminary examination of recordings of students' conversation both in the presence of and without their tutor shows that, like e-mail, learners almost exclusively used the foreign language. Moreover, despite the initial obstacles cited above, learners from both ends of the proficiency spectrum managed to hold meaningful conversations in German and French respectively with and without their tutors. Yet, a qualitative analysis of the data also revealed that learners' engagement as well as their individual success varied depending on factors such as group size, task type, learners' previous language learning experiences, their existing proficiency in the target language and their expectations of the online learning experience.

Students across languages and project phases reported that their confidence in their ability to communicate in the target language had received a massive boost. In fact, the following comment is rather typical of the feedback student offered in the final questionnaires:

> *I felt obliged to participate and the practice boosted my confidence I was amazed how much I could keep going off the cuff so to speak when I felt other members of the group were expecting my input.*

Nevertheless, students responded in different ways to the individual tasks and to the group sizes they regarded as most favourable to their learning styles. Thus, although there is a host of evidence to show that the "output brought about through [...] collaborative dialogue may allow learners the necessary support to outperform their competence and in the process develop their interlanguage" (Swain 1995:137), the mere provision of learners with options to practise a language is not a ready panacea for language learning (Ortega 1997).

3.5 Tutor role

The nature of distance education requires that students involved in this type of learning command a distinct set of strategies that allows them to cope with the specific demands of their studies. Yet it takes time to develop these skills, and learning at a distance is at first a rather unfamiliar and possibly even alienating experience for many adult learners. Thus, although "[a]ll of us are autonomous as a result of developmental and experimental learning" (Little 1996:25), successful online provision also needs to account for learners' individual preferences as well as their past experience.

Appreciating the gap between the participants' ideal level of strategic competence and their present concurrent needs, an approach was chosen that combined the availability and the guidance of a tutor with a set of tasks which were specifically designed to increasingly liberate the learner from overt tutor dependence (Hauck & Haezewindt 1999). Accordingly, tutors increasingly matched their behaviour to the perceived needs of their students in other areas. For example, tutors of the linguistically less advanced students of German often 'dropped in' to check on their progress and took on a very active role in the management of the discussion. Dealing with more advanced learners, their French counterparts, on the other hand, kept themselves more and more in the background and left it to the learners to invite them if they needed advice. In addition, the German tutorials were framed with plenary meetings at the beginning and at the end of a session while learners of French usually did not come back together as a group before the final plenary session.

Data from the questionnaires suggest that most students were generally satisfied with the role their tutors played in facilitating the interactions. The less advanced learners appreciated that their tutors were patient, pulled conversational threads together and did not "damage the little confidence you might have" while their more advanced colleagues were particularly pleased that they were given time to prepare their responses but that their tutors nevertheless "added little bits of new vocabulary, extended the subject matter of the discussion or brought others in to it". However, learners, especially those from the lower end of the proficiency scale, also maintained that they had hoped for more individual tuition and especially error correction.

Neither tutor offered a significant amount of error correction but tutors now and then intervened verbally or by using *VoxChat*'s text chat facility to suggest more idiomatic or correct alternatives to what a student had said. Some tutors also noted down students' errors and e-mailed generalised feedback to all learners in their group on the day after a given session. But although each of these approaches worked to a degree, every option also posed new problems: For instance, e-mailed feedback might arrive too late to be of use, instant written corrections might go unnoticed unless supplemented by verbal explanations and oral feedback *eo ipso* meant an interruption to the flow of the conversation. It thus stands to reason that more research is needed to identify other suitable ways for corrective feedback and that this probably also requires the use of a different set or combination of media.

4. Audiographics

A tool that promised even more flexibility than the combination of audioconferencing and e-mail became available to tutors in the spring of 1999 with the *Lyceum* software, a revised version of the OU-built KMi Stadium (Scott & Eisenstadt). The remainder of this paper introduces selected features of this tool and describes findings from pilot studies using it.

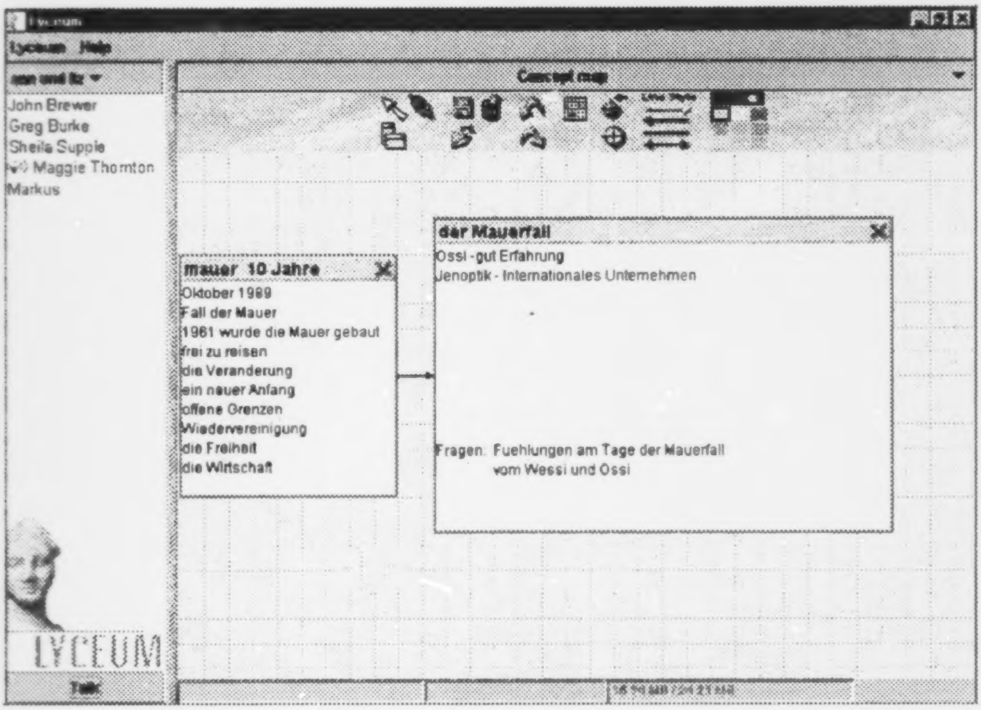
4.1 Lyceum

While the audio component of *Lyceum* provides much the same functionality as *VoxChat* in that users can interact in real time, have equal access to the floor and that a 'rooms' metaphor is employed, allowing users to subdivide into small groups in different 'rooms', *Lyceum* offers its users a choice of three graphic modules: Whiteboard and screen grab tools and a concept map facility. (The last-mentioned is shown in Figure 2 below). Every 'room' contains its own version of each of these tools, thus offering users the opportunity to share and edit graphics and text in small groups or in plenary session.

4.2 Lyceum trials

During the Lyceum trials, which were conducted with students of second-level OU German and French courses in autumn 1999, many issues that were prominent in earlier CML projects reappeared. For example, students needed time and their tutors' help to familiarise themselves with *Lyceum*. Similarly, they only gradually developed the confidence to produce longer contributions and to challenge others' views although they did not see their partners' immediate responses. But *Lyceum*, with its graphical capabilities, also allowed tutors to develop more flexible tasks and they were also able to use the 'rooms' metaphor to allow students to work in small groups, with tutors either waiting to be asked to join a group to help them, or 'dropping' in on groups to check on progress. Students took full advantage of being provided with a richer learning environment and met between scheduled sessions to prepare annotations to the graphics provided by tutors, as well as to discuss the task with which they were involved. Furthermore, learners also used *Lyceum* as a tool through which they were able to socialise with each other, and a representative response to questions about the application's use usually included a reference to such socialisation:

> *... opportunity to meet other students while removing the rush / stress of trying to get to tutorials. The combination of audio, graphics and e-mails also make it more possible for people to stay in touch. The difficulty of finding some common time when some students work and others have families who need their time in the evening would be more easily overcome.*
>
> (Second Level French student)



mauer 10 Jahre
Oktober 1989
Fall der Mauer
1961 wurde die Mauer gebaut
frei zu reisen
die Veranderung
ein neuer Anfang
offene Grenzen
Wiedervereinigung
die Freiheit
die Wirtschaft

der Mauerfall
Ossi - gut Erfahrung
Jenoptik - Internationales Unternehmen

Fragen: Fuehlungen am Tage der Mauerfall
vom Wessi und Ossi

Figure 2: Lyceum

5. Conclusion

The studies detailed above have shown that learners benefit from and enjoy using this method of communicating with each other. Their confidence increased so that they were prepared to take more risks in using the target language than has previously been the case, ask for clarification

BEST COPY AVAILABLE

and explanations both from their tutors and from their peers. Furthermore, many of them used the tools provided between scheduled sessions and emphasised the importance of social contact with other learners.

The role of the tutor, too, changed from that of the traditional 'teacher' to one of administrator, event manager and, occasionally, co-learner. Much tutor time was spent not in overtly dealing with language learning points, but in ensuring that learners were in the correct 'room' at the correct time or that they understood what was required of them for a particular activity. Peers increasingly tutored each other, rather than calling for the help of the 'official' tutor and, as activities progressed, learners increasingly decided how they wished to run their scheduled sessions; for example, tutors often attempted to call students back to plenary only to find that they had completed their allotted task for the day and logged out without notification, thus suggesting that they did not see the tutor's role as essential to the success of an activity.

As this paper illustrates, VLEs can be used successfully to support and encourage learners to take increasing responsibility for their own learning while the learning environments at the same time help to 'take the distance out of distance learning'

References

Hauck, M., & Haezewindt, B. (1999). Adding a new dimension to distance (language) learning and teaching – the tutor's perspective. *ReCALL* 11(2). <WWW document> http://www.hull.ac.uk/cti/eurocall/recall/rvol11no2.pdf, accessed February 12, 2000.

Little, D. (1996). Learner autonomy and learner counselling. In D. Little & H. Brammerts (Eds.), *A guide to language learning in tandem via the Internet* (pp. 23-34). Dublin: CLCS.

Murray, D.E. (1991). *Conversation for action: The computer terminal as medium of communication.* Amsterdam: John Benjamins.

Ortega, L. (1997). Processes and Outcomes in networked classroom interaction: Defining the research agenda for L2 computer-assisted classroom discussion. *Language Learning & Technology, 1*(1), 82-93. <WWW document> http://polyglot.cal.msu.edu/llt/vol1num1/ortega/default.html, accessed February 17, 2000.

Scott, P., & Eisenstadt, M. (1998). Exploring telepresence on the Internet: the KMi Stadium Webcast experience. In M. Eisenstadt & T. Vincent (Eds.), *The Knowledge Web. Learning and Collaborating on the Net* (pp. 153-172). London: Kogan Page.

Shield, L. & Hewer, S. (1999). 'A synchronous learning environment to support distance language learners', In: Cameron, K. (ed.) CALL & the Learning Community, Proceedings of Exeter CALL 99, Exeter, Elm Bank Publications, 379-391.

Stevens, A., & Hewer, S. (1998). *From policy to practice and back.* <WWW document> http://greco.dit.upm.es/~leverage/conf1/hewer.htm, accessed August 10, 1999.

Swain, M. (1995). Three functions of output in second language learning. In G. Cook & G. Seidlhofer (Eds.), *Principles and practice in applied linguistics: Studies in Honour of H. G. Widdowson*(pp. 125-144). Oxford: Oxford University Press.

Networked Learning in Virtual Environments

Anni Koubek and Sandra Kober

Postal Address:

Anni Koubek & Sandra Kober

FH Joanneum

Centre for Multimedia and Learning

Alte Poststr. 149

8020 Graz

Austria

Tel: +43 316 5453 8412

FAX: +43 316 5453 8432

e-mail: koubek@fh-joanneum.at

Keywords: synchronous tele-learning, social learning, virtual reality

Information and Communication Technologies (ICT) can support very well the learning process. However, one major drawback remains: the social dimension of learning can only be very poorely developed in a networked environment. The practical consequences of this fact are that most efficient learning strategies involve substantial time, where people meet physically in order to enable social learning processes. If this is geographically feasible, it definitly provides a solution for the problem. However, such meetings often involve substantial travel costs if learners are dispersed over countries or continents.

The quest for new generation technologies is to eliminate this drawback of ICT and support social learning processes.

INVITE (2000-2003) is a European project in the fifth framework programme aiming to build an innovative support system for collaborative learning over distance, focusing on aspects of social learning. The approach is to build a platform for synchronous telelearning which can be interfaced with standardised content management and/or instructional management systems. In order to reach this aim the following objectives have been set:

- identification of the relevant cognitive and social processes in collaborative learning situation and extraction of those factors into user requirements.
- development of an integrated system based on distributed virtual environment technologies , including intelligent agents real-time translation facilities, realistic avatar representation and enhanced interactivity of avatars.
- evaluation of the prototype within three different learning contexts: automotive industry, tool construction and pharmaceutical industry.
- research results on social learning processes within virtual environments.
- building a platform which has the potential to becoming a marketable product

INVITE aims at building a highly innovative environment deploying advanced technology through a multi-disciplineary, international team. The project is structured according a software development project, including three iterative cycles within its development process. The project adopts a rapid prototype development scheme, starting the development work with a visual prototype, resembling graphical design and application structure, however without functionality, in order to allow early user feedback. The development work bases on cognitive and pedagogical research regarding the user processes in virtual environments as well as the relevant factors of collaborative learning experiences.

Cognitive and pedagogical research will be carried out in order to identify the relevant aspects of collaborative learning experience. Main aim is to investigate the social dimension of learning. Multi-lingual contexts will be analysed with a specific focus on non-verbal communication behaviour. The whole work on user processes will be based on the learning paradigm of the Humanistic Empowerment Theory and Autonomy-Oriented Education respectively. The expected results are:

- Results on relevant factors for collaborative learning environments: cognitive and social factors.
- Development of a platform for synchronised telelearning supporting these cognitive and social factors.
- Results on the enhancement of learner success through INVITE, within different learning scenarious.
- A collaborative learning platform to be interfaced with standardised content and instructional management systems.

Collaborative Learning in Distance Education

Collaborative livelong learning is one of the emerging needs of the information age. Access to education is going to become crucial for the success of our information society. Therefore a lot of potential is seen in distance learning and online collaborative environments.

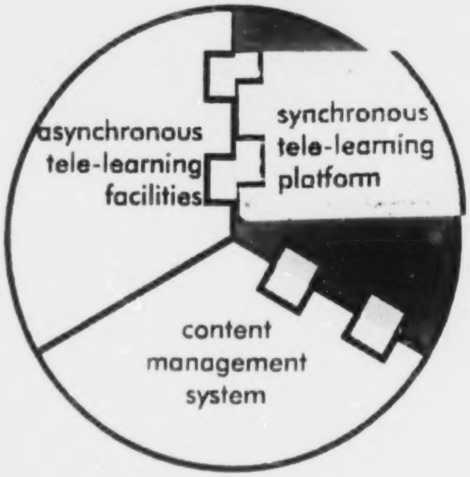
Specifically in the area of vocational training, the need for a technological support for collaborative learning is emerging. In international companies people are separated in different sites, however because of a common culture and knowledge management approach, they need to share information and learn collaboratively. Also Small and Medium Enterprises, trying to build up a network with other companies in order to strengthen competitivity, need to develop concepts to share knowledge over distance.

Both of these user-groups have a particular need of support of their collaborative learning activities over geographical distance. Such training situations will be in the focus of the project INVITE.

The project aims at the development of a collaborative learning environment for distance education through distributed and shared virtual environments. INVITE will be a platform for synchronous telelearning providing users with functionality which supports social learning process in virtual environments. For example within INVITE users will find seminar-rooms, where they can share content, point at content through their realistic avatar representation or carry out multilingual discussions. The aim is, to provide users with all those features, which are needed to create a collaborative learning environment.

The INVITE environment will be an integrated system, which is able to educate its users with the help of intelligent agents in carrying out tasks within the environment in an efficient and intelligent way. The INVITE environment will be designed as an open system, which can be interfaced with standard instructional management systems and data-representation schemes, and serve as an innovative tool for synchronous telelearning and content access.

The technological approach is the integration of DVEs (Distributed Virtual Environments) with intelligent agents in order to achieve a more friendly and efficient way for training. The DVEs accomplish the need of interaction among the users with a friendlier user interface as well as the presentation of the knowledge. The intelligent agents help the users to act within the system and to explore complex and unstructured amount of multimedia data.



The project will create a virtual environment for synchronous education and learning purposes. In addition to asynchronous applications, which usually consist of the download of predefined course material from a web server, this initiative will focus on concurrent meetings of participants, physically located on remote sites.

INVITE aims at improving and upgrading the current educational and training methods in such a way that they will be friendlier to the users, more imminent and more interesting and adaptable to their needs. It combines some of the most recent technological developments in the area of network based educational and training platforms. At the same time, it contributes to the fulfilment of the contemporary needs for faster and more effective access to information and helps to improve the functionality and user-friendliness of future information products and services.

In order to investigate user process and to guarantee user-centred design, an in-debth user integration and evaluation strategy has been developed. Within a laboratory approach, usability studies of the system will be conducted. In this environment test-persons with similar profile as end-users will allow to gain a rough overview on the usability of the system in social learning processes. In order to match the system to the user group with currently the highest demand, three different evaluation sites in cooperation with industry will be set up: automotive industry, tool construction and pharmaceutical industry. In debth evaluations will be carried out with end-users in their workplace in order to verify hypotheses built on the base of test-users.

It is an aim of INVITE to design features, which are relevant for users. For this reason cognitive and humanistic research will be carried out on the relevant aspects of social learning in collaborative situations. This will be done in a way which will cater both to the immediate need for supplying users with user-friendly attractive learning environment and the longer term need for enhancing their development as active autonomous learners.

The development of the environment will be based on user-centred design processes in which end-users are integrated at each step of the development process. Specifically, three feedback-cycles are planned in a rapid prototype scheme, in which first a structural and design prototype is presented to users, before costly development work starts.

BEST COPY AVAILABLE

Fundamental features of INVITE system are the following:

- it is loosely coupled and based on a variety of communications protocols,
- it is scalable to thousands of users,
- it is platform independent,
- it is based on open standards.

Deployment of Virtual Reality Technologies

Research and applications in Distributed Virtual Environments (DVEs) can be grouped into two camps with regards to performance of computing and networking. On one side we find military and government supported research with dedicated super computers and high-speed networks. On the other side we find a large research community that tries to bring DVEs to the regular user. With developments in computing and networking, the working conditions for these two groups approach each other. It is therefore, and increasingly will be, possible to transfer technologies and concepts from the high-end to the low end. Furthermore, DVEs need to be about something, in other words they need a pioneer application. Along with research in development in VR technologies, the importance of useful applications and convincing content should not be forgotten.

With the above in mind the INVITE project investigates ways of applying the new technologies in distributed Virtual Reality for new methods in education. In addition to asynchronous applications, which usually consist of the download of predefined course material from a web server, this initiative would like to focus on concurrent meetings of participants, physically located on remote sites. The aim is a real-time educational environment, where presence and attendance to lectures could be made compulsory for inscribed students with access to the Internet. These students have the opportunity to participate at the real event of the lecture, with the ability to raise questions to real professors, or at a specially arranged and recorded event, where the lecturers are represented by intelligent agents that can be trained to answer commonly asked questions and problems. If the associated agent mechanism is not sufficient to assist a student to provide a solution for the problem the question is transferred to a human moderator who can process the issue further and find a solution.

The INVITE system establishes virtual communities with a theme, rules, roles, and moderation where useful services can be employed to facilitate educational procedures. Rich information and useful content is used for real public exploitation and for improving ways of learning. It would be available on the actual global computer network infrastructure in use, currently the Internet, in order to contribute in the realistic deployment and take-up of distributed Virtual Reality. This system is facilitated by security and management mechanisms in order to be used for meaningful purposes such as remote collaborative learning. With the integration of various servers, INVITE system achieves the guaranteed quality of service, which is essential in learning environments.

In addition INVITE system uses Distributed Virtual Reality technologies which are capable of running on the average user's PC. These technologies are compatible with standards like VRML and they use platform-independent implementations like Java, which is a great asset particularly with regards to development, deployment and take-up. The above-referred technologies provide services, which are available to the broad public through regular equipment, found in homes and offices. The INVITE Virtual Environment allows inclusion of many real world features such as insertion and changing of objects and exchange of information with objects and users.

In conclusion the INVITE environment is an open system which can be interfaced with standard instructional management systems and data representation schemes and serves as an innovative tool for synchronous telelearning and content access.

Possibilities for Application in the Learning Context

The individual human being and his/her needs and customs are in the centre of all activities conducted in the INVITE project. The philosophical basis of INVITE stems from the Humanistic Empowerment Theory (HET) which was developed throughout the last years in the Center for Futurism in Education of the Ben Gourion University (mainly as a basis for the use of information and communication technologies in the field of education). This theory says that the major aim of democracies is the enhancement of the development and expression of its citizens personal autonomy, defined as consisting of self-awareness, rationality, and self-direction. These attributes also come to our minds when we speak of the future of a unified Europe, or a "Europe of the citizens" as it is very often denoted. There are in fact some requirements and prerequisites that should not be neglected if the critical mass of contentment of Europe's citizens is to be kept up.

INVITE will develop an innovative application for synchronous tele-learning. The application will be built according to the needs of three different industrial user groups with high need of collaborative methods in vocational training. In order to base the system not only on one specific type of training, in addition to end-user evaluation, laboratory usability tests will be carried out, in order to achieve a detailed analysis of the psychological factors of collaborative learning support. Acting on this analysis, it is guaranteed that INVITE can serve all different types of learning environments.

These very diversified test-beds have been chosen, in order to guarantee, that INVITE will not serve only one specific user group. This is essential, when observing the trends in education to open up, up-to-date narrow education schemes to new groups of learners. Universities increasingly offer continuous education, companies install their own universities and educational schemes, learning enters increasingly the home in form of edutainment.

For this reason, specific focus in the evaluation process will be given to ensure, that INVITE will be capable to support those new, open education concepts. It is clear, that particularly from such open concepts defers the need for more flexible and open learning environments, supporting also synchronous tele-learning applications. INVITE will build a platform with innovative technologies, tackling specifically those issues of open and flexible learning concepts.

INVITE has the clear focus of developing a marketable product within the project: a platform for synchronous tele-learning based on the technology of shared virtual environments. This platform should be integrated with existing learning environments providing the content management structures and asynchronous services.

The economic perspectives of INVITE are judged as follows: Currently, through the standardisation efforts of IMS and PROMETEUS, instructional management systems are becoming more harmonised. On the other hand, the market for such systems starts to consolidate and hardly is there any training or educational organisation, who has not yet investigated in the field of already installed and used such systems.

Current systems however mainly concentrate on content management and asynchronous telelearning. Synchronous applications are marginally integrated, such as test chat, or in some advanced applications video conferences. The lack of the social dimension of learning is felt already by those applying telelearning and the demand for new means of interacting and collaborating on-line will increase steadily.

Project Consortium

The project partners of INVITE are: Technikum Joanneum GmbH, Austria, Ars Eletronica Center Linz, Austria, Ben Gurion University of Negev, Israel, Blaxxun interactive AG, Germany, Brunel University, UK, Computer Technology Institute, Greece, University of Stuttgart, Germany, Linguatec GmbH, Germany, Systema Informatics Ltd., Greece, and AvatarMe LTd, UK.

References

1. INVITE – Intelligent Distributed Virtual Training Environment, Project Programme, 1999.
2. Aviram, A. Personal Autonomy and The Flexible School. International Review of Education 39(5): 419-433 (1993).
3. Bouras C., Kapoulas V., Koubek A., Mayer H., *Deployment scenarios of DVEs in education* Proceedings ED-MEDIA and ED-TELECOM 1999, Seattle, Washington
4. Coe M., *Human Factors for Technical Communicators*, Wiley 1996.
5. Gay E., *Is Virtual Reality a Good Teaching Tool?*, Virtual Reality Special Report, Winter, pp. 5159, 1994.
6. Hodgson B., *Key Terms and Issues in Open and Distance Learning*, Kogan Page, 1995.
7. Koubek A., *How much Design does Learning need?* Proceedings "ONLINE EDUCA", Berlin 1998
8. [Merickel M.L, *The Relationship Between Perceived Realism and the Cognitive Abilities of Children*, Journal of Research on Computing in Education, 26(3), pp. 371381, 1994.
9. Roussos, M., Johnson A.E., Leigh J., Barnes C.R., Vasilakis C.A., and Moher T.G., *The NICE Project: Narrative, Immersive, Constructionist/Collaborative Environments for Learning in Virtual Reality*, University of Illinois, Chicago, IL, 1997.
10. Sprio R., Feltovich P., Jacobson M., Coulson R., *Cognitive Flexibility, Constructivism, and Hypertext: Random Access Instruction for Advanced Knowledge Acquisition in Ill-Structured Domains*, Educational Technology 1991.
11. Tapscott D. *Growing up digital, The Rise of the Net Generation*, McGraw Hill 1998.
12. Winn W., *A Conceptual Basis for Educational Applications of Virtual Reality*. University of Washington, Human Interface Technology Laboratory of the Washington Technology Center, Seattle, WA. Technical Publication R939, 1993.

Universities and knowledge economies: a paradigmatic change?

GERARD MACDONALD
Institute of Education, University of London

Universities multiply, but have a common teaching style. There are exceptions, but most work within a model based on meeting of teacher and students – often with the teacher as lecturer – supported by published books and teachers' notes. It is a model that can be traced back to the time, around 640BC, when students first came to Assurbanipal's royal library at Nineveh. Central to this classical conception is the ideal of creating, evaluating, preserving and disseminating knowledge; and the condition that learners will travel to where teachers and information are – to a place called a university.

Two thousand years later, as we move toward knowledge-based economies, that movement is reversing. Knowledge, in its various forms, has become endogenous to advanced economies. It is a prime creator of value, and 'knowledge-effectiveness' is now a central measure of wealth creation (wealth which may, of course, be shared in highly unequal ways). Another issue for universities is the handling of information, which (unlike knowledge) is exponentially increasing: an increase which can be dealt with only by handling it in digital forms.

Such digitised media, in associated developments, mean that university students are no longer confined by what we may call the bi-millennial university paradigm. They no longer need to be in a particular place to share new knowledge. Information flow is changing its traditional direction – 'and with it, the university structure, making it ready to collapse in slow motion as alternatives to its function become possible'.[i]

At the beginning of the twenty-first century, those functional alternatives increase yearly. Interestingly, it is the classical form of university teaching – the lecture – which, as we shall see, is the first to be outdated by digital technologies. But other alternatives are not distant. With high-level interactivity we can now offer learning resources which are (if properly prepared) heuristically powerful and intellectually challenging. At this level, there are not yet many exemplars: but those we do have respond and adapt to the student. The growth in affordable computing power, and of adaptive programming, mean we are on the threshold of software which supports educational dialogue. Such programs will, in a sense, converse with the learner; they will comprehend the range of human discourse. That is the interactive, 'intelligent' aspect: the crucial difference between what went before and what is to come. This is another arena in which the bi-millennial paradigm shifts.

Adaptive programs change the learning matrix; broadband networking alters the information flow. As networks extend we can bring adaptive resources to students wherever in the world they are. When networks have spread through the developed world – in the next decade – higher education will enter a period of profound and, to some, disturbing change.[ii] As Eli Noam remarks of universities, if you 'change the technology and the economics, the institutions will change eventually'.[iii] It is impossible to predict how slow, or fast, the change will be. We can predict it will be comprehensive.

There are two main reasons for this. First, it is already established, in these early days of knowledge economies, that whatever is digitally delivered to the user will modify, and tend to displace, what cannot be delivered. Take television as one of many possible analogies (electricity, the telephone, radio, e-commerce, m-commerce, business-to-business networking and email are others). Clearly analogue TV did not kill theatre or newspapers, but did radically change them. Its digital successors will continue the process. What television has also done is to widen immensely the audience for news, drama and entertainment. When these are openly accessible, and brought *to* us – rather than our having to make a journey – the audience grows exponentially. (As we shall see, the quality of offering also changes.) In the same way, networked adaptivity will create a new class of learners, and new ways of learning.

Mediated instruction will not displace teachers: or not all of them. It will qualitatively alter the way, and the places, in which they work.

The second driver of structural change is economic. We consider later whether mediated education can match face-to-face teaching. Whatever the answer, the deciding factor in setting the pattern of higher education will be cost, and cost-effectiveness, rather than quality alone. It is a commonplace that electronic instruction 'is not a money-saving option'. It is not when it is added to a university's existing services. But the economics change radically if we consider virtual universities. Leaving quality aside for the moment, they can provide 'university education' at dramatically lower cost than traditional universities – and a cost that will proportionately decrease as the online audience expands. This, more than any other consideration, will weaken existing universities' hold on higher education.

As change accelerates, academics will have to decide what they want to preserve. Do universities fight for their traditional concerns: the scholarly critique of received knowledge; the furtherance of independent research? Do they hope to maintain the integrity of academic institutions as they now exist? Do they try to preserve present styles of teaching? There is a choice to be made: triage perhaps; for changing information flows will mean that not all the qualities we value will continue in the coming century. Indeed, as we shall see, without foresight and intelligent adaptation none may survive.

We can put the question another way and ask what should stay, what will certainly go, and what will be transformed, in the years ahead. What should stay, to take that first, is some (not all) hands-on laboratory work and face-to-face teaching, both carried on in small groups: that which Diana Laurillard terms a 'conversational' style of teaching.[v] As noted earlier, the most obvious candidate for extinction is the lecture room. The networking of broadcast-standard interactive video opens the possibility of higher quality 'lectures' delivered both to distant and local places. (In the US, the first enthusiastic users of 'distance learning' are often on the home campus. They see that mediated teaching is more accessible and interesting than anything offered live in the university's lecture rooms.')

In mediated form a 'lecture' can be prepared (and indeed delivered) better than if live, since the recorded version is a single performance, not one of a repetitive series. It can be supported (if the lecturer chooses) by those devices – graphics, archive material, microscopy, satellite photography, documentary film footage -- familiar to us from 'serious television'. More: it can be hypertextually linked, so that students may go straight from the digitally 'printed' version of the lecture to its references, in whatever medium. The original document opens on to a hypertextual world. And the mediated lecture will be interactive, so that students can, when they choose, interrogate it. *'What does that mean?' 'Could I have a fuller explanation of this?' 'What else has been similar?'* Repeated interruptions which would be intolerable in a lecture room can be accommodated by its networked, interactive equivalent. If the 'lecture' leaves questions unanswered, students may email their queries to the lecturer (which will mean new types of organisation for academic staff) or raise them in real or virtual seminars.[vi] Finally, students will see and hear the 'lecture' when they wish; more than once, if need be. In that respect it has the qualities of a printed book (though in future most books may be electronic, changing our conception of what constitutes a permanent record).

This scenario of online lectures suggests what many academics wish to believe: that in years to come they will do pretty much what they do now – give lectures, for instance – but in different ways. It seems likely they are wrong. It is always difficult, even in tutorials, to help students understand the structures of higher-order knowledge. It is more difficult to create mediated teaching to do the same thing. Adaptive learning programs are, by an order of magnitude, more difficult still. (Correspondingly, they are expensive to develop and evaluate.) But first some, and then many, universities will create them. So will knowledge corporations. Difficulty and cost will initially be balanced, as networking improves, by the possibility of a global audience, without the physical limits of university accommodation.
At a later stage universities will need networked publication in order to survive. Academics, thereafter, will live in different landscapes.

Consider, for a moment, what this means for the university as an institution. We will be able to see, from outside, not just the subjects taught in higher education – but the teaching itself. This is a quite radical development. For the first time in their bi-millennial history, universities will move, in the fashionable term, toward transparency.

Transparency has implications for several groups of people: first, for potential students choosing where to study. In richer countries there seems to be increasing choice in higher education. New universities mean more places a student can enrol. But this choice is still of a frustrating and limited kind: rather like choosing a hotel abroad from a travel brochure. What is true of hotels is also true of universities. As a prospective student, you might visit; but the quality of education will be elusive, until you have enrolled and experienced it. By then you are, in a sense, captive. Under our present system it is not easy to move to another university.

That will change when teaching programs in higher education are globally networked. Students may 'enrol' at more than one university; or may receive a 'university education' from some institution that is not formally a university. They will be able to experience their chosen 'university's' teaching before they enrol; and will probably read, or hear, on an adjacent website, comments on every course from current students. They may engage in online dialogue with their peers about the quality of teaching. But then, there is another scenario. After scanning the Web, a student may decide the original choice is not for her.

She may have intended to do an MBA at the college down the road. But she will find she has on offer MBAs (in networked, adaptive form) from INSEAD, from Harvard, from Stanford, from Princeton. The local college is close, but proximity will no longer persuade if Princeton is even closer – in the living room; and if the student can see that both French and American courses are better than what her own town offers.

In other words, networking will bring to universities a type of Darwinian competition they have never known, and may find disconcerting. Among many other effects, competition and adaptive programming will bring new emphasis to the skills of teaching – skills which universities have always undervalued because (unlike research publication) they have been experienced only by a captive audience of students.

The combination of transparency and connectivity will change universities' internal structures. Academically, it will dissolve disciplinary boundaries – which increasingly seem to offer security to academics, rather than explaining the world around them. Institutional frontiers will also erode. Researchers will, more and more, be part of virtual, invisible colleges without geographical limits; and the same will probably apply to the creation of adaptive teaching programs. It will no longer be enough to reject learning resources which exist (or are in development) simply on the grounds that they were 'not invented here'. As we move beyond word-processor-and-photocopier lecture notes, it will not be possible to invent everything here, wherever 'here' may be. At that stage, connectivity will offer academics several options. One is to use existing interactive learning resources: those which approximately fit with current teaching. Another is to modify what exists – which will of course raise questions around multimedia editing skills and the ownership of intellectual capital. A third option is for academics to collaborate, perhaps synchronously, on interactive documents tailored to their way of working. More than anything else, that will undermine disciplinary and geographical boundaries. For academia, this is truly the death of distance,[viii] and the end of the university as a coherent physical entity. In a fully networked world it will not be more difficult to work with a colleague in Canada than one down the hall. (The difficulty is in the mindset; we are used to collaborating in real time with people not just in the same country, but in the same room.) But the advantages of collaboration across borders – whether disciplinary or geographic – will, for some, outweigh physical proximity; which raises questions of institutional 'ownership'. If academics who are nominally at, say, Brunel University, spend more time working online with colleagues on Columbia's faculty than they do with their 'own department' – then which institution 'employs' them? Which 'owns' the consequent intellectual capital?

There will come a point, indeed, where some boundaries – between and within universities – no longer make sense. Technology drives mergers in finance and industry. It may eventually do the same in academia. University staffs, like any self-respecting professionals, will resist such change – though their own work patterns may have made it inevitable. At the University of Washington, in 1998, for example, more than 700 faculty members denounced 'visions of education with bricks and mortar ... [and] education by the Internet'.[viii] There is no sign that such resistance changed the course of the state's increasingly high-tech higher education policy.

Universities' transparency and connectivity must also change their relationship with other institutions. Higher education is moving warily into closer partnership with business. In the United States it is already estimated that 'forty per cent of large corporate training groups plan to create corporate-university partnerships this year [1998] ... allowing corporations to negotiate contracts that will encourage colleges and universities to provide courses and technical degrees customised for a particular business'.[ix] Further, we shall see legal changes already in hand in the US) to make distance learning programmes eligible for the same funding as campus courses – which will 'shift the rules of the game, [to] give new [technology-driven] entrants sources of funding, and increase buying power for non-traditional students'. This foreshadows wider corporate entry to the academic market place. To quote from the same report, 'imagine the Chairman of Microsoft contacting the Governor of California and proposing to serve more students at higher performance standards at two thirds the amount currently paid to the California State University System'.[x] As we shall see, this might, at current tuition rates, be an attractive deal for Microsoft – and for a number of other information industries.

With interpenetration of business and higher education in knowledge economies (and closer scrutiny of the one by the other) businesses will seek to influence university teaching, which will increasingly be open to corporate oversight. Some of the fastest-moving corporations are now moving toward their own type of transparency: opening their databases, for instance, to clients and service-providers. When university teaching becomes transparent, the relationship between higher education and business further changes. Some corporations will, from outside, make their own assessments of university courses and departments before supporting employees to take them, or granting research contracts. Others already opt for more active intervention. In particular, information industries – which may next century mean most industries – are concerned with knowledge obsolescence, in ways universities are not. The information sector sees certain types of knowledge as having a limited shelf-life. It will want higher education to share that perception; and this will make for some uneasy partnerships. From where we now stand, the prospects are not good for an even balance of influence between business and academia. While a few of the leading high-technology parks – in northern California, on Route 128, in North Carolina – are linked with universities, most of the tertiary sector lags, in the information arena, behind corporate research. Business will move into areas of education where universities are not keeping pace with the growth and obsolescence of knowledge. It will try to contain scientific research in corporate laboratories, where findings can be patented. Elsewhere, as privatisation proceeds, some corporations may find it easier to buy 'name-brand' universities, rather than starting their own. If that happens, the new owners are unlikely to preserve existing curricula.

The state too will scrutinise higher education more closely. On the principle of paying the piper, governments will in future be inclined to suggest new tunes. Universities may argue that the traditional campus offers conviviality and collegiality, in ways a network never could. They are right; but even now most students do not experience a traditional campus, wherever they enrol. And when networked learning becomes more educationally effective, and more cost-effective, the question will arise as to what our taxes should fund. Clearly governments' desire to expand post-school education is not matched by proportionate increases in subvention. In these circumstances – and offered a working alternative – the state may question how much extra it should pay for campus and collegiality. There are obvious attractions for government in having students also in paid employment, whether they are taking academic courses, or just-in-time training in the workplace.

As with any significant change, networking opens the possibility of alternative futures: one (which we consider first) more optimistic than the other. This scenario includes wider access to higher-order knowledge, partly through universities' increasing openness and partly through the improvement of teaching. Most universities can point to one or two 'inspirational teachers'; but this serves only to obscure the fact that much teaching in higher education is at best mediocre and at worst slipshod: often a heuristic minefield for the student. 'It is truly a miracle, and a tribute to human ingenuity, that any student ever learns anything worthwhile in such a system.'[xi] Well prepared adaptive programs, the argument runs, *must* be of higher standard; they could hardly be otherwise. New ways of teaching will treat students as active participants in the educational process; will take into account student perceptions and ways of learning and, in so doing, will break open universities' walled garden of knowledge – where the walls are those of academic obscurity as much as of intellectual difficulty.

In the same context, it's argued that institutional change will be healthy. Transparency will, it's argued, do for universities what it has sometimes done for the ossified structures of government and commercial oligopoly: it will (unlikely as the terms sound in this context) produce leaner, flatter, delayered, more responsive university organisation, focused on core business and ready to compete in a global marketplace.

But other factors, beyond universities' control, make the future less promising. One is commercial competition – going beyond the global, inter-university competition networking will bring. The ultimate providers of an electronic curriculum 'will not be universities becoming televersities (they will merely break the ice) but rather commercial firms'. The real cost of university tuition is around £40 ($60) per student-hour at current prices. With such a financial incentive, 'alternative providers will inevitably enter. Today's students, if they seek prestigious jobs or entry-restricted professions, usually have no other choice than taking the university route.'[xii] But that is a weak legal reed for universities to lean on. If this gatekeeper control weakens,' then, in deregulated academia, commercial corporations 'will be able to compete with traditional universities, without bearing the substantial overhead of physical institutions'.[xiii]

Britain's universities fare worse in this pessimistic scenario than those in America. Structurally, they are ill suited to a change of educational style. This was belatedly recognised in a report by the Committee of Vice-Chancellors and Principals which warned that 'there are a growing number of focused, targeted institutions of high quality which are delivering fully accredited distance learning, such as the University of Phoenix, a for-profit franchise organisation which is developing dominance in slices of the market. Such developments could fundamentally challenge UK [academic] activity in some areas'[xiv].

The Open University is currently Britain's standard-bearer in academic distance learning. It took a significant step forward with its adoption of course teams, but so far shows little sign of adapting with equal skill to Web-based interactive education. Traditional universities are a stage further back. With some justice they feel that moving to the creation of adaptive learning programs will force British academics to exchange something they generally do quite well – face-to-face teaching in tutorials and small groups – for something they will do reluctantly and badly. And by the time academia has adaptive programs ready to be networked globally there may be commercial products in the field which, while popular, will fall short of the standards most universities think acceptable. (At another level this is already true: most commercial 'educational' software on the market is either educationally trivial or unapologetically regressive. These are products based on cognitive psychologies which confuse instruction with learning, just as the programs' content confuses information – which is relatively easy to present – with knowledge, which is relatively hard to achieve.) As Britain's vice-chancellors warn, in higher education we may find corporations displacing universities, just as quick-and-profitable programs could drive out, or sideline, what is truly adaptive and educational – and correspondingly difficult to create. In other words, wider choice may debase academic coinage.

Again, there is a loose analogy with television. Digitisation means multiple channels and, we are told, diversity of choice. But broadband house-to-house networking will change the game again. It will bring genuine video on demand – which is difficult, but can (and so will) be achieved. When we have hundreds of programmes instantly available in the home, how many people will sit on a sofa to watch 'the evening's viewing': that is, the slow downloading of a few videos, chosen daily by someone in London or New York who knows little of the viewer's taste and preference? The answer is: not a large number. What was once the mainstream television audience will dwindle to those for whom decisions are too hard. As traditional channel-viewers disappear, so will traditional channels. In opting to do our own programming online we may extend choice, but we also attenuate the culture. Whatever PR people now say, in a fully networked world we shall lose the established broadcasters, and all other institutions set up to make televisual decisions on our behalf. They will no longer be viable; and much worthwhile programming will disappear with them. For the moment, then, we can summarise television's future as 'more choice; less to choose from'. That may also be true of electronic education.

As with any technological discontinuity, networking will redistribute social influence. Universities' openness to corporate and state scrutiny may curtail their freedom to criticise the structures of economic and political power, and to outline alternatives. Academic autonomy – already on the wane – may be further eroded. So we come back to our starting point. Higher education should make its choices now. If the academic paradigm does change in the coming decades, what should universities fight to preserve?

The academic consensus seems to be that universities should preserve the tradition of independent research; the open exchange of knowledge; freedom to engage in critical scrutiny of received wisdoms and the command structures of any society. To this we might add face-to-face teaching in small groups – which at best will always have qualities and value absent from computer-mediated communication.

Can these things be preserved? It's an article of academic faith that educators, not politicians, should reform universities. In reality, as we all know, reshaping any institution is a perquisite of power. As universities become more transparent it is clear they are losing the privileges of an enclosed order: they are losing their mystique, their legal privileges and, with them, influence. At a time of change, then, universities may (if we simply extrapolate from present to future) have diminishing ability to preserve what they see as essential. But there is another, more positive, view. Even if we discount futurists' hyperbole, it seems clear that knowledge production will be central, at least to developed economies, in decades to come. And universities are, as they always have been, primary producers of knowledge.

There are large conjectures here. Of course if universities, decades from now, are still central to knowledge production, and if they voluntarily restructure to meet the information-based financial and social transformation now gathering global momentum in the knowledge economies, then they may perhaps have power to maintain what they most value. But the signs are not propitious. Commenting on Daniel Bell's optimism about universities' place in the knowledge economy, Castells remarks that 'universities do not seem to have emerged as the central institutions of postindustrial society: corporations (both private and public), hospitals and health care systems, school systems[xv] and the media are such central institutions, deeply transformed by the intensive use of new information and communications technologies.[xvi]

Before long, we shall see to what extent universities' bi-millennial paradigm is eroded, or overturned. We shall see whether traditional universities can adapt – or whether the technologies and economics of knowledge societies will reshape, or eliminate them.

---

[i] Noam, Eli, M 'Electronics and the dim future of the university' *Science Magazine* 18 August 1995.

[ii] If satellite communication becomes genuinely interactive then less-developed countries may have their own broadband networks – though their digital infrastructure may still be weak.

[iii] Noam *ibid*

[iv] Diana Laurillard *Rethinking University Education* Routledge 1993.

[v] *Chronicle of Higher Education* 27 March 98

[vi] Certain American universities (notably the University of Phoenix) already use videoconferences as a standard way of conducting tutorials.

[vii] Frances Cairncross *The death of distance* Orion Business Books 1997

[viii] *Higher Education Chronicle*

[ix] *Computerworld* 13 Apr 98

[x] Coopers and Lybrand White Paper 'Transformation of Higher Education in the Digital Age' May 1998

[xi] Diana Laurillard *Rethinking University Education*

[xii] In a significant change to traditional preparation for the entry-regulated professions, 1999 saw the University of London offer the world's first online law degree.

[xiii] Noam *ibid*

[xiv] *The Independent*, London, 16.9.98

[xv] We may question the degree to which school systems have been so transformed; but there is no doubt that they will be.

[xvi] Castells, M in Castells *et al: Critical Education in the new information age* Bowman and Littlefield 1999

An Evaluation of Stage One: The Impact of Introducing Web-Based Learning Technologies on Post-Secondary Teaching and Learning Processes

V. MacSwain, D. Mattock, W. Robertson
University of Prince Edward Island
Prince Edward Island Canada

ABSTRACT

This paper describes stage one of the impact on learners, teachers and systems of implementing the WebCT course management tool in two very different post secondary institutions. The University of Prince Edward Island's (UPEI) curricula are based on a very traditional course and program model. Holland College's curricula are based on modules and skills development. The research evaluates how each institution implements WebCT as a curriculum development and delivery tool in which Web components will be selectively employed to give learners more independence and teachers increased options in how to schedule and teach. How both institutions adapt their infrastructures to accommodate WebCT is evaluated.

Background and Origins

Prince Edward Island, Canada's smallest province, is a member of the Maritime Provinces on the Atlantic seaboard of Canada. Its Indian name is Abegweit ("land cradled on the waves"). The highest point on the island is 494 ft (152 m). Its length is 140 miles (224 km) and it is 4 to 40 miles (6 to 64 km) wide. It is connected to the mainland either by bridge (12 minutes) or ferry (75 minutes). It has a population of 137,000.

The University of Prince Edward Island is Prince Edward Island's largest post secondary institution and the only university on the Island. It was founded in 1969 on the tradition of liberal education through a merger of St Dunstan's University and Prince of Wales College, both having origins in the 1800s. It exists to encourage and assist people to acquire the skills, knowledge and understanding necessary for critical and creative thinking, and thus prepare them to contribute to their own betterment and that of society through the development of their potential. It has 2500 full time and 500 part time students.

The University of Prince Edward Island's curriculum is based on the traditional course and program model. Students enroll in a course of study or program, normally a four year Bachelor program in which they complete the required courses. Courses are usually one semester in length and are designated 3 semester hour courses. The University uses a semester system normally fifteen weeks in duration. Semesters run from September to December and January to April. Summer sessions are also available. Students graduate with a Bachelors degree when they complete the required 120 semester hours of credit in their field of study.

Holland College is Prince Edward Island's second largest post secondary institute. It accepts both full-time and part-time students into its programs. The college uses the Competency Based

Education System (CBE) which uses a methodology that emphasizes the specification, learning, evaluation, and demonstration of those competencies which are central to a given occupation, or activity as validated against criteria defined by business or industry (Fraser, 1999). The competency based system emphasizes the how to in a skill and the learners are active participants in the program activities, they learn the skills through hands on learning techniques. The curriculum is based on the occupational analysis approach know as the Develop a Curriculum (DACUM) Model. This model uses a methodology for analyzing an occupational field in terms of its relevant areas of competency and associated skills (Fraser, 1999).

Holland College's curriculum is delivered through the learning managers where the students are the learners and the learning managers are the instructional staff. The students enroll in a program that is typically two years in length and are assigned a learning manager who they work with throughout their two year program on an on-going basis for consulting, course status, and progress reporting. The learners progress through a series of skills and modules. The learners complete the program when they have received the minimum number of required ratings on all the skills that make up their program. The competency level in a particular skill is determined by rating the learners' performance against the performance assessment criteria outlined in the Skills Guide. For this the Industry Standard Rating Scale is used. Using this method of instruction the learners are encouraged to progress and achieve results, discovering their abilities and learning from their experience, as they acquire the skills necessary to enter employment in their chosen fields.

Rationale for Study

In 1997, the University of Prince Edward Island and Holland College received funds through the Knowledge Economy Partnership, an initiative of the Federal and Provincial Governments, to establish an Information Technology in Education Centre (ITEC). Each institution set up its own physical facility and began to incorporate increased uses of information technology (IT) in its teaching and learning processes. The two ITECs are moving closer together in looking for ways they can cooperate in using IT to explore new teaching strategies that have potential for improving learning and/or reaching adults who cannot or are unwilling to participate in existing program delivery options. Staff in both units are aware that there is a reluctance by both teachers and learners to make use of IT either because they perceive it to be difficult to use or they are suspicious of the potential benefits it might bring to both groups. Both institutions are about to increase their use of web-technologies in teaching and have the resources to develop web-based learning materials.

Both institutions are capable of creating and delivering programs using new learning technologies and are also very capable of conducting a study in the impact of those technologies on both teachers and learners who use them. Both institutions have web-based educational projects that begin in 1999 and that are expected to evolve for several years as new ways of using web-technologies, perhaps supplemented with other communications technologies, are explored and evaluated.

Their experience with implementing other forms of learning technologies - audio conferencing, satellite-delivered interactive instructional television, email discussion groups – lead them to a series of assumptions about how learners, teachers and institutions will react to the use of web-based learning technologies:

- specific impact will be unpredictable and adjustments will have to be continuous

- many learners and teachers will be unprepared to make effective use of web-based learning opportunities
- access to web-based learning resources may be difficult for some potential learners and special entry points or resources may have to be provided
- new learning and teaching skills will have to be learned and practiced
- additional learning technologies, such as CD-ROMs, audio or videoconferencing, may have to be used to supplement the core web-based learning technologies to maximize learning or minimize resistance to using new learning technologies
- infrastructure changes in areas such as copyright policy, scheduling, completion dates, assessment policies, learner progression will be inevitable for most institutions

Target Audience

The direct study participants will be:

- UPEI
  Philosophy Program and Business Management Program - 2 groups of up to 25 learners from each program area; minimum of four faculty members

- Holland College
  Business Information Technology Program - 2 groups of 25 learners from two streams of the Program; minimum of 6 instructor/learning managers

Indirect participants will be:

- UPEI
  An additional 30 to 40 faculty in the Faculties of Education, Arts, and Science and the Schools of Business and Nursing who are all part of a web-technology study and interest group that has the objective of making use of some web-based learning technologies in their courses both on and off-campus. Collectively, they have approximately 300-400 learners in their programs.

- Holland College
  An additional 10 plus instructors and about 200 other students in the Program

The study will be carefully monitored to see what it reveals that will assist the two institutions to decide whether or not to move quickly or more deliberately (if at all) in some use of web-based learning technologies. Similarly, universities in the Atlantic region are considering the establishment of a form of cooperative Open University in 2000 that will be dependent on web-based learning technologies for a good part of its curriculum delivery. Decisions on how such an institution would operate and how support would be given to potential users of web-based learning technologies may well be based, in part, on the outcome of the study. Preliminary study on the feasibility of the Open University of the North Atlantic suggest several hundred courses and faculty would be involved within several years and enrolments of the order of 3,000 to 5,000 within five years (Graham, 1998). To make those kinds of financial and intellectual investments, institutions and individuals need more than exhortations and anecdotal evidence to convince them to change their systems and attitudes.

Outside the Atlantic region, any college or university contemplating or reviewing its involvement in web-based learning technologies would be interested in the study results. The Project Committee believed that the issue is not whether or not to use web-based learning technologies but how to introduce them to an institution as smoothly and effectively as possible with the minimum of institutional strife and cost.

Original Project Description

The ITECs of the University of Prince Edward Island and Holland College will each follow two distinctly different types of classes as they introduce web-based learning technologies into their teaching-learning processes. The new course materials were to be developed and be ready for use in September 1999. The study is to be a goal-free evaluation approach for two years, tracking the same groups of learners and teachers through two years levels of using web-based technologies in a variety of courses. Years One and Two will be primarily an evaluation of how the learners and teachers deal with the new technologies. UPEI is primarily an undergraduate institution with a traditional two semester, four-year program. Holland College operates on a two year program cycle and the study group will move through entry to graduation from the College during the study. Two program areas have been selected because of their very different curricula and our ability to follow learners and teachers over a minimum of a two years period. Year Three will be used to do an intensive evaluation of the impact on teachers and their institutions as well as on a "graduate" follow up with learners to see how they were making use of web-based technologies.

Stage One Update

The study was to begin July/August 1999. Due to delays in receiving grant approval, the project committee did not meet until late October. To date it still has not agreed on the research questions and the position of senior researcher has just been advertised. Stage One was to have been completed by January 2000. Therefore the study is behind schedule by four months. There appears to be difficulty in the committee reaching a consensus on the research methodology. Some favor quantitative data others qualitative data. This still needs to be resolved.

Where to Now? What's Happening? Why?

The most foremost question to be addressed is whether or not the Project Committee is "asking the right questions?" The fact that it appears to be having a difficult time in identifying the research questions, as they relate to the project objective may give some insight into what happened during stage one.

Stephen Ehrmann (1997b) reminds us that "asking the right question" is necessary if information technology research is to have any value. He is correct in stating bad questions or generalizations on technical versus 'traditional methods' will not yield valuable insight for the teacher/learner. He also tells us (1997a) for a study to be useful we should evaluate which teaching learning strategies are best and to which technologies are best for supporting those strategies.

Therefore this study's question may be "Are the project objectives clear and achievable?". Will the data reflect the 'real' issues confronting the institutions? Consider the study's objectives and what the data is to identify :

- What distinguishes early and enthusiastic adopters of web-based technologies from hesitant or reluctant users - both learners and teachers? Question: "What is the baseline for what is a hesitant or reluctant user?"

- What adjustments in teaching and learning processes initially chosen by participants and later accepted as good teaching and learning strategies for using web-based technologies. Question: "How does one establish a baseline for good teaching and learning practices?"

- What are the infrastructure changes post-secondary institutions must make to maximize benefits of using web-based technologies to develop and deliver curricula? Question: "What is the baseline for measuring 'maximum' benefits using web-based technologies to develop and deliver curricula?"

- What are the access issues that are both created and reduced or eliminated by using web-based technologies? Question "What is the definition of 'access'?"

- What are the new directions that post-secondary institutions should be taking to use web-based technologies for extending educational services to learners whom are currently not able or willing to participate. Question: "What is the scope and boundaries of extending educational services to non users of the technology?"

All of the above objectives are very open in their scope. It may be that the questions being asked are not being directed to the real issue – that of instructional design. It is as if the technology is being evaluated. Technology in itself is only a tool which may or may not enhance the learning process. Multimedia may offer relief to those students who do not have a print-based learning style but the media is not the learning experience. The questions may need to be changed to have a clearer reflection of the institutions' and learners' needs. Its scope may need to be contained to allow for the collection of data relating to 'real questions' being asked by the institutions.

Phillip Duchastel (1997) cautions us about shoving old models onto the web. He states it is not unusual for academics to use the web as a novel publishing medium for instruction conceived within the traditional university instructional paradigm. He does not see universities using the web as a means to break out of the traditional paradigm of professor-centered university instruction. According to him there are other issues which need to be researched and assessed - evaluation, lack of open-mindness, content-driven courses, communication skills, changed role of printed matter, and roles of professors. If the Project Committee is composed of 'traditional' minded individuals then it may be questionable whether it can separate the tools from the instructional design.

How research questions relate to the teaching-learning requirement is the key. Duchastel (1997) states there are four requirements present in any advanced instructional setting: information, interactivity, structure and communication. These are the requirements, which need to be reviewed. How the tools do, or do not, enhance the learning experience is secondary. It is the instructional design that enhances the individual's learning experience.

Clark and Kozma (1994) state the research questions that need to be asked are:

Ask whether a technology could teach without specifying anything about the teaching methods involved.

All benefits attributed by previous research to "computer" or "video" could be explained by the teaching method they support.

Research should focus on specific teaching-learning methods, not on questions of media.

Where does that leave this study. Well, it is evident that the Project Committee has not clarified in its mind just what is the purpose of the study. It will remain to be seen whether or not the direction of the research will address 'real questions' as identified by the above researchers. The next few months will hold that answer.

References

1. Clark, R. (1994) cited *in Educational Technology Research and Development, XLII:2, 3,* Washington, DC: Association for Educational Communications and Technology.
2. Duchastel, P. (1997) A Web-Based Model for University Instruction. *Journal of Educational Technology Systems*, XXV:3 pp. 221-228.
3. Ehrmann, S. C. (1997) Asking the Right Questions: What Does Research Tell Us About Technology and Higher Learning? Change Magazine, the magazine of *Higher Learning, XXVII:2* (March/April 1995) pp. 20-27.
4. Ehrmann, S. C. (1997) *"FLASHLIGHT" PLANNING GRANT"*. Funded by FIPSE. Copyright Annenberg/CPB.
5. Fraser, B. (1999) *Building a Competency-based Rating Tool for WebCT.* Holland College Knowledge Management Unit, Prince Edward Island Canada. Version 2.5 pp. 1-7.
6. Graham, D. (1998) *University of the North Atlantic: A study undertaken for the members of the UNA Consortium.* Maritime Province of Canada
7. Kozma, R. B. (1994) cited *in Educational Technology Research and Development, XLII:2, 3,* Washington, DC: Association for Educational Communications and Technology.
8. Office of Learning Technologies (1999) *Evaluation of the Impact of Introducing Web-Based Learning Technologies on Post-Secondary Teaching and Learning Processes.* A proposal submitted by Holland College Information Technology in Education Centre in partnership with University of Prince Edward Island Information Technology in Education Centre.

Organizational change and networked learning: A structurational model

Professor Stewart Marshall
Dean, Faculty of Informatics and Communication
email: s.marshall@cqu.edu.au

Associate Professor Shirley Gregor
Head, School of Computing and Information Systems
email: s.gregor@cqu.edu.au

Central Queensland University
Rockhampton QLD 4702

Abstract

What structure and processes are needed to allow a university to exist and prosper in an age of globalization and rapid changes in the information technology underlying networked learning?

This paper presents a model based on the structurational theory of information technology (Orlikowski and Robey, 1991). This model posits four relationships: (1) information technology is a product of human action; (2) information technology is an influence on human action; (3) organizational properties are an influence on human interactions with information technology; and, (4) information technology is an influence on the organization. The model is extended to include the market, technical and societal influences from the external environment that affect an organization.

As an example of a university in Australia that is responding to the challenge of networked learning on a national and international basis, we examine Central Queensland University (CQU). It has been a distance education and on-campus education provider since 1974 and is now Australia's fastest growing university. Inherent in all CQU's operations is a model in which the organization, its members and its partners are all constituents of a network of learning facilitators.

Key terms-- **online, e-business, change, process, higher education**

Introduction

As the world moves online, pressure increases on industries and organizations to change the way they do business. According to Turban, McLean and Wetherbe, (1999), pressures acting on industries and organizations result from: the market, technology, and society. *Market pressures* include global competition and consumers who are becoming more demanding; *technological pressures* include the use of e-commerce to lower the costs of production and transaction costs; and *societal pressures* include government regulations and economic conditions.

The higher education industry and universities are subject to the same pressures as other industries and organizations in the online world. For example, in Australia, university enrolment of foreign students is the country's seventh largest export earner. Because of the internet, Australian universities must now *compete* with universities offering online courses from outside the country. So universities must change the way they do business.

> *Those institutions that can step up to this process of change will thrive. Those that bury their heads in the sand, that rigidly defend the status quo - or even worse - some idyllic vision of a past that never existed, are at very great risk. ...... The real question is not whether higher education will be transformed but rather how and by whom?*
>
> Duderstadt, 1999, p.1

Implications of the online world for structure and process in industries and organizations

In considering the implications of the online world for industry we need to consider both *structure* and *process*, where process includes *change processes* (Gregor and Johnston, 2000; Johnston and Gregor, 2000). For example, one defining characteristic of an industry structure is the degree to which vertical integration has occurred. Vertical integration and alliances are formed by negotiation over periods of time. The result is a structure that becomes formalized to some extent.

In the literature the idea that process (activity) and structure are reciprocal has been advanced by writers such as Giddens (1984). In Giddens view, structure is the "rules and resources recursively implicated in social reproduction; institutionalized features of social systems have structural properties in the sense that relationships are stabilized across time and space" (p. xxx1). Rose (1999) states that "Agents in their actions constantly produce and reproduce and develop the social structures which both constrain and enable them" (p. 643).

This link between process and structure is important also at the organizational level. In order to develop technology and systems to survive in the online world an organization must engage in certain processes, such as business process re-engineering. These processes are of great importance – many information systems fail and we have what is termed the *productivity paradox* (Brynjolfsson and Hitt, 1998). This paradox refers to the fact that investment in information technology appears to be unrelated to increased outputs or wages at a national level. One explanation of the productivity paradox is that some organizations do not pay sufficient attention to processes within their organization when introducing new technology. If organizational change is not implemented well, and work processes not redesigned, the new systems do not lead to gains in productivity.

Thus, we need to consider change and processes of change as well as structure. We have a particular view of organizational change. This view is that change is "emergent". Change is not solely "technology led" or solely "organizational/agency driven". Change arises from a complex interaction between technology and the people in an industry or organization (Markus and Robey, 1988).

The conceptual model developed here is based on the structurational theory of information technology (Orlikowski and Robey, 1991). This model posits four relationships: (1) information technology is a product of human action; (2) information technology is an influence on human action; (3) organizational properties are an influence on human interactions with information technology; and, (4) information technology is an influence on the organization. The model is extended to include the market, technological and societal influences from the external environment that affect an organization.

So what are the implications of the online world for industry structure and process? Barriers to participating in electronic transactions are decreasing. Rather than having networks only link existing trading partners in a tightly coupled environment, new electronic markets could conceivably include larger numbers of buyers and sellers (Malone, Yates & Benjamin, 1987). On the other hand there is evidence for hierarchical arrangements supported by electronic networks, with firms in many industries reducing the number of their suppliers, and entering into contractual arrangements for the supply of goods. These arrangements constitute supply chain management. The arguments from economic theory for the changes in market structures are complex. Holland and Lockett (1994) propose an "anything-goes" or mixed-mode hypothesis where firms develop different forms of market and hierarchical relationships that are maintained simultaneously. The interrelationships and interdependencies of governance structure, asset specificity, market complexity and coordination strategy will determine interorganizational arrangements (Klein, *1998)*.

A value chain consists of the movement of components through various stages of production and distribution as they are transformed into final products. A firm can decide to produce each of the goods and services needed along the value chain in-house or to out-source it. There is a view that greater use of interorganizational networks will lead to vertical disintegration and greater out-sourcing. However, evidence to support this view is still being collected (Steinfeld, Kraut & Chan, 1998). Some expect disintermediation to occur, where intermediaries are removed because of the ease with which they can be bypassed on electronic platforms. Others expect to see different forms of intermediaries and cybermediation.

It appears that maximum benefit is obtained from e-business when it is integrated with other applications in the organization. This integration can require re-engineering of the way in which the organization does business. E-business reduces the costs of handling paper-based information, e.g., the cost to the U.S. Federal government of a paper cheque was 43 cents compared to 2 cents for an electronic payment (Turban, McLean & Wetherbe, 1999). Small companies can use the Internet for marketing and compete against firms globally at comparatively little expense. Employees can work from home or from different parts of the globe. Teams can be linked with electronic communication.

To summarise, the implications of the online world for industry include: market transformations, the need for alliances, changes in outsourcing behaviour, and changes in the role and type of intermediaries. In addition, the need for re-engineering and the manner in which organizational change is approached must be considered carefully.

What structure and processes are needed to allow a university to exist and prosper in the online world?

Changing universities

Universities and the higher educational sector face similar challenges to other industries in the online world.

> *Universities are due for a radical restructuring. After centuries of evolutionary changes, they are faced with carving out new roles and methods to get there. Today the predominant model is still the combination of traditional teaching and academic research as mapped out by Wilhelm von Humboldt in the last century. The guiding*

> *principles of Humboldt's vision of the university are forschung und lehre (research and teaching) and of professors, einsamkeit und freiheit (solitude and freedom). But change is unavoidable and pressure for change is increasing from the public, the media, and political groups. This change is mainly driven by the new technological possibilities and the new learning environments they enable.*
>
> (Tsichritzis, 1999, p.93)

Specific implications for universities can be drawn from the conceptual model based on the structurational theory of information technology (Orlikowski and Robey, 1991):

- Organizational change arises from a complex interaction between technology and the people in the organization. For example, information technology makes possible new learning environments and changed work practices for university staff.
- Information technology can influence changes in organizational structure. The improved communication options offered by advances in information technology support the formation of alliances and the "unbundling" of the functions of the university (content, packaging and presentation). This vertical disintegration, in which functions are differentiated and either outsourced or dealt with by partners in strategic alliances, creates new intermediaries in the learning/teaching network.

There is evidence of organizational change arising from the interaction of technology and people in some universities. For example, in the United States of America, institutions of higher education are collaborating to create technology-based consortia, referred to as "virtual universities". In Australia, online and videoconferencing systems are being developed as alternatives to face-to-face communication where the people are physically dispersed. These methodologies require both staff and students to change existing practice and to acquire new literacies (Wallace and Yell, 1997).

The new technological possibilities (and new learning environments which arise from the interaction between technology and the people) include: the internet (facilitating synchronous and asynchronous interactions between learners); video-conferencing (facilitating tutorials comprising distributed groups of students, and also remote access to live lectures); digital libraries (as knowledge repositories); computer simulation (substitutes for laboratories); etc. Overall, the interaction of these new technologies with the people creates a learning environment in which learners, tutors and learning resources can all be networked.

But these same technological possibilities also permit new working environments for those charged with the facilitation of learning. Thus lecturers can use the internet for synchronous and asynchronous communication with colleagues, video-conferencing for meetings, digital libraries for research, etc. The interaction of these new technologies with the people creates a teaching environment in which lecturers, tutors and teaching resources can all be networked.

There is also evidence of changes in organizational structure which have been influenced by information technology. Traditionally, universities have carried out all the functions relating to the provision of higher education: content production; packaging content; credentialing programs; presentation to students; marketing; registration, payment and record keeping; and, assessment. In the online world, these functions can more readily be "*disintegrated*" and the university can specialise in those functions which it regards as its "core business", forming alliances for other functions or outsourcing to new intermediaries in the value-added chain. As the various functions of the higher education process are differentiated, so too the nature of work and the workforce change (Coaldrake & Stedman, 1999).

The function of content production is perhaps the one seen as most likely to remain with universities. But there are those who even suggest the need for outsourcing and alliances for the performance of this function. Gibbons (1998, p.61) predicts that universities "will learn to make use of intellectual resources that they don't own fully. This is the only way that they will be able to interact effectively with the distributed knowledge production system". For example, Unext is an internet-based distance learning 'university' which utilises content developed by the London School of Economics, Chicago, Colombia, Stanford and Carnegie Mellon Universities, and delivers MBAs to the corporate sector.

Gibbons (1998, p.61) suggests that we should see a university as "a sort of 'holding institution' in the field of knowledge production, perhaps limited to accrediting teaching done primarily by others while in research doing their part by forming problem-solving teams that work on fundamental issues". This view sees the core business of the university as participating in *knowledge production* and *credentialing* the teaching programs of others.

Case study of one university in Australia

Central Queensland University (CQU) is one regional university in Australia that is responding to the challenge of the online world. CQU has 15,000 students and is now Australia's fastest growing university in terms of international students.

In Central Queensland, CQU's traditional catchment area, there are campuses at Rockhampton, Mackay, Gladstone, Emerald and Bundaberg. A key component of this integrated network of campuses is the Interactive System-Wide Learning (ISL) system – a synchronous video link which facilitates networked learning. Thus, on these campuses, classes are taught using combinations of synchronous video delivery of live lectures, videoconferencing to connect distributed groups of learners, web-delivery, synchronous and asynchronous computer mediated discussions, and face-to-face classes.

CQU has been a distance education provider since 1974. Distance education students are serviced with a combination of printed, CD-ROM and web-delivered material, as well as electronic asynchronous communication for class discussion and mailing lists.

CQU formed an alliance with a commercial partner, Campus Management Services, to establish campuses at Sydney in 1994, Melbourne in 1996 and more recently in Brisbane. At these campuses the students are mostly of international origin. In addition, there are campuses operating in Singapore, Hong Kong and Fiji. At all these campuses, the CQU programs are tutored by locally appointed academic staff, with an emphasis on teaching rather than research. The mode of delivery is face-to-face tutorials and lectures, but utilising the resource materials produced by the staff in Central Queensland.

Inherent in the CQU partnership with Campus Management Services is a model in which the function of content production has been detached from other functions (e.g., lecturing) traditionally carried out by the university. This vertical disintegration, in which functions are differentiated and either outsourced or dealt with by partners in strategic alliances, creates new intermediaries in the value chain.

For both on-campus and distance education modes, CQU has moved to a networked learning paradigm, using communication and information technologies to link learners, tutors and other learning resources. But it has also moved to a networked teaching paradigm in which lecturers, tutors and teaching resources are all linked. Thus, a lecturer on one Central Queensland campus is designated as the coordinator of a particular unit (course), and that person then coordinates the collection of the resources, the creation of the materials, and the activities of the learning facilitators/tutors on all the other campuses on which that particular unit (course) is taught.

To facilitate the management of this complex operation and to increase its competitiveness in the online world, CQU is engaged in a large re-engineering project. This project, named "Project Renaissance", will install PeopleSoft systems for finance, student administration and human resources over a period of three years and involves a project team of 80 staff. The project is not just about software but about the way CQU does business - processes and procedures are being re-examined to facilitate networked education, streamline the organization and allow it to compete more effectively.

Concluding remarks

We have identified forces leading to change in industries in the online world including increasing global competition, increasingly powerful consumers and rapid changes in technology, especially those related to telecommunications. Implications for industry include market transformations, the need for alliances, changes in outsourcing behaviour, the need for re-engineering, and changes in the role and type of intermediaries.

In the higher education industry, pressures for change include global competition and technology facilitated learning. Outcomes are evolving, but include the formation of alliances, outsourcing and re-engineering of systems and work practices. In particular, the communication and information technologies which facilitate networked learning, also link lecturers, tutors, and teaching resources to create the possibility of networked education.

References

Brynjolfsson, E. and Hitt, L. M. (1998) Beyond the productivity paradox, *Communications of the ACM*, 41:8, 49-55.

Coaldrake, P. and Stedman, L. (1999) Academic Work in the Twenty-first Century: Changing roles and policies. Department of Education, Training and Youth Affairs (DETYA), Commonwealth of Australia, <http://www.detya.gov.au/highered/occpaper.htm>

Duderstadt, J.J. (1999). Can colleges and universities survive in the information age? in Katz, R.N & Associates, *Dancing with the devil - information technology and the new competition in higher education.* San Fransisco: Jossey-Bass.

Gibbons, M. (1998). Higher education relevance in the 21st century, UNESCO World Conference on Higher Education, Paris, October 5-9.

Giddens, A. (1984). *The Constitution of Society.* Cambridge, Polity Press.

Holland, C.P., and Lockett, G. (1994). Strategic choice and interorganizational information systems, in J.F. Nunamaker and R.H. Sprague, (eds.). *Proceedings 27th HICSS, VOL IV, Collaboration technology, Organizational Systems and Technology,* IEEE Computer Society Press, Los Alamitos, CA, 405-413.

Johnston, R. and Gregor, S. (2000). A structuration-like theory of industry-level activity for understanding the adoption of interorganizational systems. *European Conference on Information Systems*, Vienna, July.

Gregor, S. and Johnston, R. (2000). Developing an understanding of interorganizational systems: Arguments for multi-level analysis and structuration theory. *European Conference on Information Systems*, Vienna, July.

Klein, S. (1998). The diffusion of auctions on the Web, in C. Romm and F. Sudweeks, *Doing business electronically*. Springer, London, 47-63.

Marcus, J. (1999). Rise of the fast food learning model, *The Time (Higher Education Supplement)*, 3 September.

Markus, M. L. and Robey, D. (1988). Information technology and organizational change: Causal structure in theory and research, *Management Science*, 34:5, 583-598.

Malone, T., Yates, J., and Benjamin, R. (1987). Electronic markets and electronic hierarchies: Effects of information technology on market structure and corporate strategies, *Communications of the ACM*, 30:6, 484-497.

Orlikowski, W.J. and Robey, D. (1991). Information technology and the structuring of organisations, *Information Systems Research*, 2:2, 143-169.

Rose, J. (1999). Frameworks for practice – structurational theories of IS, *Proceedings of the European Conference on Information Systems*, (p. 643).

Steinfeld, C., Kraut, R., and Chan, A. (1998). The impact of interorganizational networks on buyer-seller relationships, in C. Romm and F. Sudweeks, *Doing business electronically*, Springer, London, 7-26.

Tsichritzis, D. (1999). Reengineering the university, *Commmunications of the ACM*, 42:6, 93-100.

Turban, E., McLean, E., and Wetherbe, J. (1999). *Information technology for management*, Wiley, New York.

Wallace, A and Yell, S. (1997) New literacies in the virtual classroom. Southern Review, 30:3, <http://www.infocom.cqu.edu.au/Staff/Susan_Yell/Teaching/fmctl/liter.htm>

ARGUMENTATIVE INTERACTION IN AN ACADEMIC E-MAIL COURSE

Miika Marttunen and Leena Laurinen
Department of Education, University of Jyväskylä, Finland

Introduction

The shift from the information society towards the network society has brought with it new challenges to human communication. Now that we are used to sending e-mail messages and gathering information from the www, the question arises of how to make the best use of these technological tools. The easy and rapid way in which messages can be exchanged provides a good basis for developing communication skills, especially in a country like Finland where people prefer silent consideration to argumentative questioning. Previous studies (Steffensen, 1996) on higher education in Finland have indicated that the typical Finnish student lacks both a critical attitude towards knowledge and a willingness to engage in critical discussion. Similar results have also been reported by Mauranen (1993), Laurinen (1996) and Hirsjärvi, Böök, and Penttinen (1996), who found that even though students were approaching the end of their studies, they nevertheless found it difficult to participate in seminar debates. They hesitated to criticize each others' opinions or that of the teacher, who was regarded as an authority whose views should not be called into question.

Electronic mail can be regarded as an appropriate medium for developing Finnish students' argumentation skills at the university level. It has been shown that students' e-mail messages improved as discussion conducted by e-mail proceeded during a six-week course on argumentation (Marttunen, 1997). Ruberg, Moore and Taylor (1996) have also indicated the facilitating effect of e-mail in establishing interaction between students.

E-mail as a communication medium possesses many features that facilitate person-to-person communication. First, e-mail discussions are *asynchronous* (time and place independent) in nature, which means that e-mail messages can be written and read at any time convenient to the user. Second, e-mail has been characterized as a *democratic* medium that allows various kinds of people regardless, for example, of personal appearance, occupational status, and level of education, to participate in interaction on an equal basis. Third, when communication is textual and the participants cannot see each other *the threat of loss of face* (for Goffman's use of this term, see Brown & Levinson, 1987) in the course of discussion is not so great as in face-to-face situations. Fourth, the *informal* nature of e-mail language also makes it easier for one to put forward opinions and arguments: a typical feature of the nascent e-mail culture is that texts do not have to be carefully revised, but it is enough that the writer's ideas can be understood. Fifth, the participants have *time to consider* how to express their thoughts and arguments since they have to be formulated as written text.

Recent studies have indicated that the use of networks, especially e-mail, has increased and enriched communication between students (Kearsley, Lynch & Wizer, 1995; Ruberg et al., 1996) and promoted students' learning results in terms of subject contents (Alavi, 1994; Hacker & Sova, 1998). Studies in which the content of e-mail and face-to-face discussions has been compared (Marttunen & Laurinen, 1999; Newman, Johnson, Cochrane & Webb, 1996) suggest that students' argumentation is more developed and more carefully structured when e-mail is used. Furthermore, studies based on experimental pretest-posttest designs have indicated that students' argumentation skills have improved during academic e-mail courses (Marttunen, 1997; Marttunen & Laurinen, in press).

Although e-mail has proved its usability as a learning environment and as an argumentative forum, knowledge about the most effective ways of arranging learning situations and assignments is lacking. Up to now, the focus has largely been on the role of the teacher. Marttunen (1998) found that students produced more developed arguments when the teacher acted as a facilitator and respected their self-directiveness than when of acting as an authoritative tutor. However, there is insufficient knowledge on how students' e-mail working can best be arranged for the purposes of practising argumentation skills.

This article describes a teaching experiment in which academic argumentation was practised in a ten-week course in a Finnish university. In the course two forms of discussion were used: free debate and role play. The aim of the study was to clarify how these two forms of discussion activate students in mutual argumentative dialogue and affect its quality.

Method

Teaching arrangements

Two small groups ($n = 5$, $n = 6$) of students (8 female, 3 male) took part in course in argumentation that was organized during the spring term of 1998 in the Department of Education at the University of Jyväskylä, Finland. The course involved 1) e-mail seminar discussions based on learning material, 2) lectures on argumentation (2 x 2 hours), and 3) exercises. The learning material consisted of argumentative writings taken from newspapers and periodicals as well as scientific texts. The writings were based on four educational topics: 1) sex roles and equality in education; 2) discipline problems in school: causes and proposed solutions; 3) the compulsory teaching of Swedish in school (a currently controversial educational topic in Finland); and 4) physical punishment as a child-rearing method. The learning material also included exercises in argumentation. The exercises introduced the students to the content and argumentative structure of the text material, and in this way prepared them for the subsequent argumentative discussions relating to the texts that formed the basis of the seminar sessions. The purpose of the lectures was to provide the students with theoretical knowledge on argumentation to be utilized during the seminar discussions. In the first lecture the main conceptual apparatus used to describe the argumentation process was introduced and in the second lecture the fundamentals of argumentation analysis.

Free debate and role play were used as working methods in organizing the students' e-mail discussions. During *free debate* the students' discussions were based on themes 1 (Sex roles) and 2 (Discipline problems). Students freely selected from the seminar texts the discussion topics and the claims they wished to defend. Thus, the students were able to focus on topics they found interesting, contradictory, or important. During *role play* the students discussed themes 3 (Compulsory Swedish) and 4 (Physical punishment). Here the task of half of the students was to defend a given standpoint, while the other half had the task of supporting the opposite position. In this way the discussion was polarized.

Data

The total number of messages sent by the students during the course was 326. The number of messages sent by the 8 female students was 219 (67%), and by the 3 male students 107 (33%). The proportion of messages relating to the different working methods and discussion topics is given in Table 1.

Table 1. The distribution of messages by method of working and discussion topic

	Free debate		Role play		Total	
Discussion topic	*f*	%	*f*	%	*f*	%
Sex roles	84	50	0	0	84	26
Discipline problems	83	50	0	0	83	25
Compulsory Swedish	0	0	84	53	84	26
Physical punishment	0	0	75	47	75	23
Total	167	100	159	100	326	100

Data analysis

The analysis was carried out in two phases. In the first phase the references to messages sent by other students were identified from the messages sent during the course. The messages were then classified into three categories: monologue, dialogue and web-messages (c.f. Lai, 1997). A *monologue message* did not include any references to messages sent during the course. It consisted of a student's opinion or point of view of the discussion topic. A *dialogue message* consisted of references that indicated that only two students had participated in the discussion on the topic. If more than two students had engaged in the discussion on the same topic the message was classified as a *web-message*. Dialogue and web-messages together were classified as interactive messages.

In the second phase of the analysis the reference was used as the unit of analysis (c.f. Henri & Rigault, 1996). The students' references were classified along two dimensions. The first dimension (Position taking) showed whether the students *disagreed, agreed* or had taken a *neutral position* in relation to the standpoint of a fellow student. The other reference categories were *questions*, *answers to questions*, and *other* (mainly short comments).

The second dimension (Role) described the writer's role in the argumentative discussion. It consisted of six main categories: problematization, attack, defence, counterattack, admission, support, and participating. In a reference indicating *problematization* a student had taken a critical attitude towards the issue in question. The writer had, for example, pointed out deficiencies in a fellow student's message or put forward alternative ways of approaching the issue. A reference classified as an *attack* included targeted disagreement with a fellow student's position. A *defence* was a reply to an attack already put forward. It indicated that the writer defended his/her original argument by clarifying the reasons given or by adducing new reasons. In the case of a *counterattack* the writer defended him/herself from an attack by reattacking the arguments the attacker had used, while in the reference classified as an *admission* the writer accepted the attacker's criticism and indicated a readiness to change his/her original argument. References classified as a *support* indicated the writer's willingness to support or strengthen a fellow student's standpoint, and in a reference classified as *participating* the writer did not reply to a fellow student's standpoint but mainly participated in the discussion by adding something to the topic. The inter-rater (n = 37) reliability coefficient (C) for the two variables was .87 for Position taking and .82 for Role.

Results

The students wrote a total of 73 (22%) monologue messages, 153 (47%) dialogue messages, and 100 (31%) web messages during the course. The number of the different types of messages was approximately the same regardless of the working method. When the messages relating to the different discussion themes were compared monologue messages were found to be more common when discipline problems were being considered as compared to messages on sex roles (29% vs.

16%). Interactive messages (dialogue + web messages) were, however, more common (84% vs. 71%) when sex roles was the topic (chi-square $= 4.37$, $df = 1$, $n = 167$, $p = 0.42$). No differences were found between messages relating to compulsory Swedish and physical punishment.

Almost a half (44%) of the students' references ($n = 362$) to other messages indicated that the writer had taken a neutral position in relation to a fellow student's standpoint (Table 2). In 25% of the references a student had shown disagreement and 24% of the references indicated agreement. References indicating disagreement were more common during role play than during free debate (33% vs. 18%), whereas the students produced more references indicating agreement during free debate (33% vs. 15%). The proportions of references indicating a neutral position were about the same during both free debate and role play.

Table 2. Types of references in the students messages in terms of position taking and role

	Free debate			Role play			
Type of reference	Sex *f(%)*	Dis *f(%)*	Total *f(%)*	Com *f(%)*	Phy *f(%)*	Total *f(%)*	Total *f(%)*
Position taking							
Disagreement	18(17)	15(19)	33(18)	33(36)	24(29)	57(33)	90(25)
Agreement	35(33)	27(33)	62(33)	15(16)	11(13)	26(15)	88(24)
Neutral	43(41)	35(43)	78(42)	39(42)	41(50)	80(46)	158(44)
Question	0(0)	2(3)	2(1)	3(3)	2(2)	5(3)	7(2)
Answer	4(4)	1(1)	5(3)	1(1)	2(2)	3(2)	8(2)
Other	6(6)	1(1)	7(4)	2(2)	2(2)	4(2)	11(3)
Total	106(100)	81(100)	187(100)	93(100)	82(100)	175(100)	362(100)
Role							
Problematization	8(8)	13(16)	21(11)	28(30)	31(38)	59(34)	80(22)
Attack	13(13)	14(17)	27(14)	21(23)	18(22)	39(22)	66(18)
Defence	5(5)	2(3)	7(4)	9(10)	4(5)	13(7)	20(6)
Counterattack	1(1)	0(0)	1(1)	2(2)	3(4)	5(3)	6(2)
Admission	3(3)	1(1)	4(2)	0(0)	1(1)	1(1)	5(1)
Support	39(37)	28(35)	67(36)	12(13)	9(11)	21(12)	88(24)
Participating	37(35)	23(28)	60(32)	21(23)	16(20)	37(21)	97(27)
Total	106(100)	81(100)	187(100)	93(100)	82(100)	175(100)	362(100)

Sex: Sex roles and equality in education; *Dis*: Discipline problems in school: causes and proposed solutions; *Com*: The compulsory teaching of Swedish in school; *Phy*: Physical punishment as a child-rearing method.

The most common roles assumed during discussions were those of participant and supporter: 27% of references indicated participation and 24% indicated support. During role play, however, the students more often attacked a fellow student's standpoint (22% vs. 14%) or presented a problematizing view (34% vs. 11%) than during free debate. The students, however, produced more references showing support (36% vs. 12%) and participation (32% vs. 21%) during free debate.

The most common type of reference that indicated a response to a previous attack was a defence (6%). It is, however, worth noting that on most occasions students did not respond at all to attacks on their own arguments: although there were 66 (18%) attack references, there were only 31 references indicating a response (20 defences, 6 counterattacks, 5 admissions) to an attack.

Discussion

The most common references in the students' messages were those that indicated a neutral position in relation to other students' positions. This result supports previous results according to which Finnish students are not willing to participate in critical discussions (Steffensen, 1996). However, when the students were assigned opposed roles in the role play sessions critical discussion and argumentation increased notably, while during free debate the students mainly agreed with each other or expressed neutral positions.

The roles most commonly taken by students during the course were those of participation and support. This indicates that an active argumentative role was not often taken during the discussions, but students tended merely to either support or ignore each others' arguments. The small number of replies to other students' attacks on one's position also indicates that Finnish students prefer to keep silent than respond to criticism. Participation and support as roles were typically emphasized during free debate, while role play activated the students to attack each others' opinions or, at least, to take a problematizing role in the discussion.

References

Alavi, M. 1994. Computer-mediated collaborative learning: an empirical evaluation. *Management Information Systems Quarterly* 18 (2), 159-174.

Brown, P. & Levinson, S. C. 1987. *Politeness. Some universals in language usage.* Cambridge: Cambridge University Press.

Hacker, R. & Sova, B. 1998. Initial teacher education: a study of the efficacy of computer-mediated courseware delivery in a partnership context. *British Journal of Educational Technology* 29 (4), 333-341.

Henri, F. & Rigault, C. R. 1996. Collaborative distance learning and computer conferencing. In T. L. Thomas (Ed.). *Advanced educational technology: research issues and future potential* (pp. 45 - 76). Berlin: Springer.

Hirsjärvi, S., Böök, M. L. & Penttinen, L. 1996. 'Sit me ruvetaan oleen tieteellisiä subjekteja' - Tieteellisyyden rakentuminen opiskelijadiskurssissa. ['Then we became scientific subjects' - Students' discourse about science]. In: L. Laurinen, M-R. Luukka & K. Sajavaara (Eds.) *Seminaaridiskurssi - diskursseja seminaarista* (pp. 163-190). Jyväskylän yliopisto. Soveltavan kielentutkimuksen keskus.

Kearsley, G., Lynch, W. & Wizer, D. 1995. The effectiveness and impact of online learning in graduate education. *Educational Technology* 35 (6), 37-42.

Lai, K-W. 1997. Computer-mediated communication for teenage students: a content analysis of a student messaging system. *Education and Information Technologies* 2 (1), 31-45.

Laurinen, L. 1996. Pro gradu-tutkielman tekeminen ongelmanratkaisuna - tutkielmaseminaari keskustelu- ja oppimistilanteena. [Preparing a pro-gradu thesis as a problem-solving process - the study seminar as a discussion and learning situation]. In: L. Laurinen, M-R. Luukka & K. Sajavaara (Ed.) *Seminaaridiskurssi - diskursseja seminaarista* (pp. 191-230). Jyväskylän yliopisto. Soveltavan kielentutkimuksen keskus.

Marttunen, M. 1997. *Studying argumentation in higher education by electronic mail.* Jyväskylä, University of Jyväskylä. Jyväskylä studies in education, psychology and social research 127.

Marttunen, M. 1998. Electronic mail as a forum for argumentative interaction in higher education studies. *Journal of Educational Computing Research* 18 (4), 387-405.

Marttunen, M. & Laurinen, L. 1999. Learning of argumentation in face-to-face and e-mail environments. In F. H. Van Eemeren, R. Grootendorst, J. A. Blair & C. A. Willard (Eds). *Proceedings of the fourth international conference of the international society for the study of argumentation* (pp. 552-558). Amsterdam: Sic Sat, International centre for the study of argumentation.

Marttunen, M & Laurinen L. In press. Learning of argumentation skills in networked and face-to-face environments. *Instructional Science.*

Mauranen, A. 1993. Opiskelijan diskurssimaailmat - vaihto-opiskelijoiden perspektiivi. [The students' discourse worlds - exchange students' perspective]. In: H. Jalkanen & L. Lestinen (Eds.) *Korkeakoulu-opetuksen kriisi. Artikkelikokoelma Jyväskylässä 19.-20.8.1993 järjestetystä korkeakoulutuksen tutkimuksen V symposiumista* (pp. 169-188). Jyväskylä: Kasvatustieteiden tutkimuslaitos.

Steffensen, M. S. 1996. *How Finns and Americans persuade.* Paper presented at the 11th World Congress of Applied Linguistics (AILA 96), 4-9 August. Jyväskylä, Finland.

Newman, D. R., Johnson, C., Cochrane, C. & Webb, B. 1996. An experiment in group learning technology: evaluating critical thinking in face-to-face and computer supported seminars. *Interpersonal Computing and Technology* 4 (1), 57-74.

Ruberg, L. F., Moore, D. M. & Taylor, C. D. 1996. Student Participation, Interaction, and Regulation in a Computer-mediated Communication Environment: A Qualitative Study. *Journal of Educational Computing Research* 14 (3), 243-268.

The Practice of Networked Learning : Experiences of Design and Participation.

David McConnell (d.mcconnell@sheffield.ac.uk), Nick Noakes (lenoakes@ust.hk), Patricia Rowe (paddy.rowe@hwlc.ac.uk), William Stewart (willt@compuserve.com)
University of Sheffield

INTRODUCTION

This paper considers a continuing professional development networked learning Masters course which is about learning and teaching via the Internet. In the paper, one tutor and three course participants describe their experiences of the course as a way of illuminating some issues around the design and participation of networked learning.

We start with an over view of the course, which is followed by the personal perspectives. We finish with some general remarks about learning and teaching in networked learning environments.

THE BACKGROUND TO THE MED

The MEd in Networked Collaborative Learning by action research is an advanced part-time "at a distance" programme designed to provide participants with a comprehensive grounding in the theory and application of networked learning. On the programme, we focus on learning about the new information and communication technologies; designing online learning; developing learning communities; and working with online groups of collaborative learners.

We aim to help course participants appreciate and understand the ways in which they can use the Internet and the Web in their professional practice, and how they can design and evaluate learning events which focus on group work and are based on sound principles of action learning and research (Winter, 1989) and problem based learning (Boud and Feletti, 1998). We try to emphasise the implementation of innovatory online practice by creating a supportive and creative online research learning where participants can feel free to experiment and "learn by doing", while constantly holding a critical perspective on their practice and the theory underpinning it.

We have been running the programme since 1996.

THE RESEARCH LEARNING COMMUNITY

In the programme, we wish to emphasise the educational need for learners to work in social learning environments where they can feel "connected" to other participants and tutors, and where they have a sense of a lively, highly interactive learning community. Participants and a tutor work closely in a learning set (anything between 6-10 members), as well as the whole community working together on "community wide" issues and concerns. This is linked to the capability of the Internet to support groupwork and provide a virtual environment for learners to work together, share resources and collaborate. Within this virtual research learning community perspective (Pedler, 1981; Fernback, 1999; Smith and Kollock, 1998; McConell, 2000), participants have opportunities to:

- have a wide choice over the content and direction of their learning

- manage their own learning, and cooperate with others in theirs through processes of negotiation and discussion
- take a critical perspective on learning and academic issues with strong relationships to their professional practice
- focus on their own learning and development from a critical, reflective perspective, combined with an understanding of relevant academic ideas and concepts. A means for doing this is exposure to other participants' development within the learning community
- participate in developing the research learning community perspective, which is based on participants and tutors taking collective responsibility for the design and evaluation of the programme, via constant review and modification of the design, procedures and ways of working

The programme is run on an action research mode of learning (Winter, 1989), and is based on a philosophy which acknowledges that people learn in different ways. The action learning/research focus allows participants to make choices about the management, focus and direction of their learning. Throughout the programme, there is an emphasis on reflecting on our education practice, for both participants and tutors alike.

ASSESSMENT

Participants submit three pieces of work in Year One, and a further one plus a research dissertation in Year Two. Topics chosen for course assignments are negotiated with staff and other participants, and are focused on practical professional issues and problems relating to participants' own work (Boud and Feletti, 1998). In addition, they are required to work with other participants in producing a collaborative piece of work in each workshop.

Assessment is part of the learning process on the MEd, and forms a major part of the content of the programme. Course assignments are submitted for triangulated assessment i.e. assessment where the writer, their co-workers in the learning set and the set tutor read, comment and assess the assignment (McConnell, 1999; McConnell, 2000). Assessment is on a pass/fail basis. We feel this approach to assessment is consonant with, and supports, the overall aims and values of this course, which are largely concerned with forms of cooperative and consultative teaching and learning. We aim to model this form of teaching and learning within the course, so providing participants with experiential learning of computer supported cooperative learning.

Although participants are not assessed on their contribution to the online work and discussions, it is a course requirement that they fully participate in them. It is not possible to gain a Pass without full online participation.

THE EXPERIENCE OF LEARNING AND TUTORING

In preparing for this paper, the tutor invited the three course participants to join him in writing about their experiences of learning and tutoring on the MEd. The invitation was sent by email : *"... (snip) I have in mind a presentation that would explore each of your experiences of taking the Med - from whatever perspective you feel you would like to take."* We spent several weeks sending each other emails and refining our contributions. Below are the three participant contributions and the tutor's.

The Learners' Perspective

Nick Noakes : Threading Community

The filters for my experiences on this course come from being a language teacher using a cooperative, collaborative and discovery learning methodology, a teacher developer, a frequent online learner and a less frequent online facilitator, working within an Asian adult and higher education context. From these filtered experiences, the most significant area for me has been the development of a learning community and the activities within the programme that have engendered this.

This community building started with a series of tasks at the face-to-face meeting in October 98. These tasks were aimed at connecting us personally, professionally and as learners and at giving us a high degree of autonomy. They were also organised to include reflection on purpose and process, and not just content or outcomes. All of these I see as real strengths. Although, the repetition of similar tasks and the time given for them generated frustration for some participants, the goal of beginning the process of community building was achieved. However, the one strong feeling that was generated within me at the face-to-face, and still endures today, is Pedler's notion of "liberating tension" that comes with such an open, autonomous structure (Pedler, 1981). On returning to Hong Kong, I was very enthusiastic about working with my first self-chosen learning set as well as the full cohort.

My participation and energy stayed high through to the end of the first workshop in Jan '99. I kept in touch with what was happening in other sets and from this felt part of the whole cohort and not just the learning set I was in at that time. For me, the self-chosen cooperative and collaborative projects built on the feelings of community and created a nice balance between shared and individual concerns. The action research based cooperative assignments helped us to 'ground' our learning and to share more of our contexts and ourselves with our peers. The high degree of reciprocity in this strengthened the community further. The community building was also reinforced through the self-chosen assessment criteria (alongside the programme ones) and the peer review. The latter caused anxiety for some as they felt that they weren't 'qualified' to provide such constructive feedback. But, the fact that these feelings were present also demonstrated the existence of community. Community building was also strengthened through two programmed periods of collective reflection for each workshop; one at the learning set level in the middle after the collaborative assignment and the other at the end for the full cohort.

As the programme developed, I began to feel what I would call learning community bio-rhythms at three levels: individual, learning set and cohort. Just as our asynchronous discussions were threaded so was our participation; with long and short periods of low and high levels of intensity threaded among individuals within a set and threaded within the cohort. At the cohort level, participation was highest during the end of workshop reflection and decision periods called "the pause" but this got referred to as the "community gallop" as people became swamped with a "red tide" of new messages which tended to work as much against community building as for it. At the learning set level, participation was collectively highest when assignment deadlines became due. But individuals learning rhythms varied considerably being impacted deeply by external factors such as work demands, job-loss, divorce, family bereavement and personal illness.

As we are all now near the end of the M.Ed. with only our dissertations left, I feel incredibly supported by everyone in the cohort. I know that whatever type of problem I meet, I have a peer group that won't let me down. And given that I'm some 5,000 miles away, I think this says a lot about the learning community that we have collaboratively weaved.

Paddy Rowe : First experiences

Installing - got linked up to the University server via Lotus Notes just before the residential so I felt like a bona-fide cyber-citizen.

This achievement would be just the start of very steep learning curve. The curve analogy would be replaced at times by that of a vertical wall, not constructed to keep people out, more in the spirit of adventure training, with a few footholds and voices 'off' yelling encouragement.

First postings

My first postings to the Welcome 98 database within Lotus Notes sent in the pioneering spirit of 'brave new world'.

I had been typing all of my message in the subject heading space. This error was pointed out by one of the tutors and quickly rectified, so first and typical example of 'learning by doing', very much a theme of the Med.

Collaborative problem solving demonstrated after only one or two postings - not bad!

During the residential, I was surprised that there was not more emphasis on learning the intricacies of Lotus Notes given that this mode of communication would be the major interface between us for the entirety of the course.

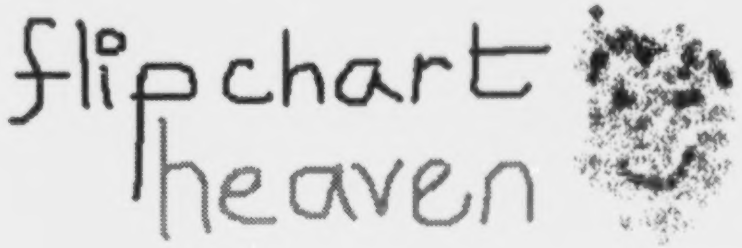
What I found most refreshing during the 'hands-on' sessions at the residential was the ability to personalise the technology with the pervasive sense of humour we, as a group, had already experienced in the face to face sessions.

For example of LN humour see below - a tongue-in-cheek reference to a running gag about:

Flipzip Flapzap

Jack Kerouac on 10/06/98 at 11:29 AM

ho hum



`Abort, fail, retry? Y N`

First set

Level of communication almost frenetic with most members of the set feeling obliged to answer every posting, this phenomenon later coined as the **'the Red Tide'**, so named because any 'unread' postings appear as red text in the databases.

Lotus Notes is easy to use and good examples of threading showing responses to responses, etc.

Suggestions being made by some participants about the protocol for postings giving rise to debates about the content, eg: avoiding 'cyber nods' and 'cyber pats; such as 'I agree' or 'Good idea', etc.

Finding reading on the screen very difficult indeed so I would copy and paste to a word document and print out, however, printouts not representative of true narrative as newer postings not accounted for.

Debate rages later about the most effective use of Lotus Notes to cut down on the volume of postings.

Some discussion about having designer rights to add to existing tables (eg: when deciding who would review what) rather than having to copy and paste each time. Easy to add attachments, others managed to play with comments boxes. Adding URLs to postings for resources very common but not possible to access to link by simply clicking. Discovered a way of referring back to a previous posting by doing document link into the posting.

After first set to present

BEST COPY AVAILABLE

Designer rights achieved by some members. The aim of this more direct control over the organisation of postings being, not to diminish discussion activity, but harness it into a more organised format.

I would like to have taken part in this experiment but was already feeling I had reached my plateau of learning with accessing LN; using the web to access resources; experimenting with ICQ synchronous meetings (managed a 5-way with South Africa, Hong Kong and various locations in UK) and trying to get to grips with web page authoring for workshop 3.

Databases become large, unwieldy and a barrier to communication in their maturity. To combat this problem, new databases are opened with every workshop.

Although the level of postings has dropped quite considerably since the first, enthusiastic sets, the technology has, nevertheless kept me engaged in the course in a way which has surprised me, in fact, I don't think I would have sustained a traditional face to face course for 2 years without the degree of flexiblility distance learning has afforded me.

Will Stewart : Reflections on the first workshop

During those early months we were all "learning" to work online. The need for collaboration had come through strongly at the residential and, from the start, this was one of the most obvious characteristics of the Learning Sets. At the end of that first month I wrote in my Reflective Diary:

Like the residential week, the supportive nature of the on- line group has developed quickly. There has been an immediate openness and supportive feedback. People who admitted not previously being happy in this kind of environment, were happy to "come out" and open up to the group.

Individuals are thinking out loud on line. The first 3 weeks have seen very frequent interactions occurring. With 10 members in the group, the initial response has been quite staggering - no real warming-up period.

We were making good progress in sharing needs, providing resources and working together to plan our collaborative project.

At about the same time, I wrote that our collaborative project was:

..coming along well with all individuals contributing.. How would it be if there were people who didn't contribute ? How would this be handled by the group tutor ?

It had quickly become clear that the success of the group was dependent on everyone's contribution. If one individual had opted out or had been a freeloader then the viability of the group would have been compromised.

During this initial period individuals were obviously feeling their way, checking out what was acceptable online behaviour and sizing up what was a safe level of openness. We were learning how to support each other online and how to make group decisions. We were learning how to give and receive comments and criticisms in a supportive and meaningful way.

In short, we were all learning how to collaborate effectively in an online environment.

Towards the end of the first collaborative project I wrote:

The week before the deadline for submission of the collaborative project was quite exciting. We had put most of the ideas into the pot and the challenge was now to put it all together into a cohesive document.

The individual strengths of each member became apparent during that final week.

It felt good to be working hard, while at the same time knowing that everyone else was also working just as hard.

This entry illustrates how the individual differences within the group were actually crucial in helping us make progress on the collaborative project.

At about the same time I concluded that:

The idea of "positive interdependence" (McConnell, 1994) has been clearly demonstrated within the group. I feel that we are all aware that both personal and group success is dependent on us working together and supporting each other. I think that this has been reinforced by the successful experience of the collaborative project. In this situation, I would say that we each achieved our own personal rewards by collaborating ("positive goal interdependence"), but we also achieved a successful group outcome ("positive reward interdependence") (McConnell, 1994).

The first four months were an exciting time. I had survived my first experience of an on-line learning community and was now ready to dive head long into Workshop 2.

David McConnell :Some Issues on Facilitating the Learning Community

I had been working on this course since its inception in 1996. This particular cohort started out with a tutor team of four : myself, Shelagh Avery, Celia Graebner and Bob Toynton. We collectively planned the course and were particularly concerned to ensure that the first residential in Sheffield (1) was carefully designed in ways that encouraged the development of a research learning community which would continue into the online (Lotus Notes) workshops.

This first residential was a testing ground for exploring the many challenges that lay ahead for us all – tutors and participants alike - during the next two years. We wanted to develop a sense of openness in the learning community : a context where direction, decision making and planning would be shared to a large degree. It soon became apparent to us that many participants found this open learning approach extremely challenging. At times there seemed to be a palpable air of anxiety. Clearly, from our perspective as tutors, it seemed that many participants had never experienced what it is like to "manage" their own learning and work in a collaborative community. It seemed that for some, a profound shift in their perception of themselves as "learners" was occurring. The challenge to manage some aspects of their own learning, and to contribute to the development of the learning community, was a completely new experience.

At the end of the week, one participant (an engineer from a South African University) commented that if he had been told in advance that we would be learning in these ways, he would not have believed it. Yet by the end of the week, he felt very positive about the prospect of working in this way, and a sense of real achievement in contributing to the development of the community. This, I think, was a feeling shared by many participants. But clearly, some members were still anxious about what lay ahead in the online workshops. As a tutor, I was well rehearsed for supporting this situation, and although I did not feel in anyway blasé about the way things would develop online, I did know that working as a learning community would stretch us all, both intellectually and emotionally. That seemed like an appropriate context in which to learn.

We worked largely in learning sets during the online Workhsops, with whole cohort activities such as discussions, seminars, shared readings and so on taking place alongside the learning set work. A major whole cohort activity after the residential was the collective, reflective period between Workshop One and Workshop Two. This was deigned to be a two week period during which we would all review the activities and learning experiences of Workshop One, and plan for the group work in Workshop Two. We tutors had called this a "Pause" to emphasise what we thought would be a relaxed period of contemplation and sharing. It turned out to be a highly active period of debate and discussion. The level of participation by those involved (and not everyone did fully participate – it seems some felt exhausted after the first Workshop and needed a break) was huge. It took me straight back to the residential period, and all those emotions of trying to make decisions, collectively review and plan stood out again – this time on the screen. It was an overwhelming experience at times, and we tutors spent considerable time in our own Notes data base, (off stage as it were), discussing the event, analysing what was happening and why, and working out a strategy for helping the community move forward.

Facilitating a networked learning community of the kind described here is hard work. It requires constant attention to what is going on in the community, and a willingness to make it possible (facilitate) for those participating to "own" the ways in which the community develops. This passing over of the power relationship (from tutor to a community in which the tutor is a member) is full of contradictions. It forces tutors to be open about their educational intentions and to reflect long and hard on their own practice as it becomes manifest in the community. There is much still to be understood about what is involved!

CONCLUSION

These four perspective on the same learning event – the MEd in Networked Collaborative Learning – indicates a richness in the experience of working together as a learning community. We did not deliberately choose to offer different perspectives : they emerged from our plans for writing this paper, and are clearly authentic "voices" of a shared experience

Our work in developing the MEd as a place for community, collaborative learning and an environment for experiencing and reflecting on networked learning group work continues. Although many participants have said that the residential meetings are important for developing the community, we are now forced to abandon them as we re-design the course as a completely virtual event in an effort to attract more overseas participants. It seems to be asking too much of people to travel across the globe to participate in the residentials. We are, however, confident that our experiences of running the online Workshops, and facilitating the development of the online learning community, will provide the insights needed for a new phase in the development of the course.

(1) Since then the course has gone completely virtual, with no residential meetings.

Details of the MEd can be found at : http://www.shef.ac.uk/uni/projects/csnl/

References

Boud, D., Feletti, G., Ed. (1998). The Challenge of Problem Based Learning. London, Kogan Page.

Fernback, J. (1999). There is a There : Notes Towards a Definition of Cybercommunity. Doing Internet Research : Critical Issues and Methods for Examining the Net. S. Jones. Thousand Oaks, Sage: 203-220.

McConnell, D. (1999). " Examining a Collaborative Assessment Process in Networked Lifelong Learning." *Journal of Computer Assisted Learning*. 15, 232-243

McConnell, D. (2000). Implementing Computer Supported Cooperative Learning. London, Kogan Page.

Pedler, M. (1981). Developing the learning community. *Management Self-development : Concepts and Practices*. T. Boydell and M. Pedler, Gower, UK.

Smith, M., Kollock, P. (1998). Communities in Cyberspace. London, Routledge.

Winter, R. (1989). Learning from experience : principles and practice in action-research. London, The Falmer Press.

"Let's be careful out there!" - Learning in the world of electronic information

Liz McDowell & Alison Pickard
University of Northumbria at Newcastle, UK

Introduction

Access to information is seen as one of underpinning infrastructures and essential features of lifelong learning and is supported by government initiatives (for example DfEE, 1997). The availability of vast information resources in the electronic information world is often viewed as a positive and, indeed, liberating feature of networked learning. Claims are made that the use of electronic information enables more learner-centred approaches. If learners can undertake independent discovery and explore alternatives rather than being reliant on their teachers to provide the information they require, this provides a foundation for lifelong learning.

In this paper, we aim to challenge the assumptions that access to a wealth of information will necessarily lead to the extension of learning opportunities and better learning. We draw on data from two research projects, both of which gathered data through case studies and adopted qualitative, interpretative approaches to illustrate experiences of learning, teaching and supporting learning in the electronic information world. The Higher Education study (McDowell, 2000) was an element of the IMPEL2 eLib-funded project[1], which undertook a set of case studies across UK HE institutions. Its purpose was to illuminate the organisational and cultural impacts associated with rapid technological and educational developments, from the perspectives of academic, library and learning support staff. The school study was based on sixteen case studies of Year 10 students in four secondary schools. It formed part of a PhD investigation of the experiences of electronic information use and learning (Pickard, 1998).

Pam's story

One of the students in our research, Pam, described her experience of trying to find information from the Internet for a school assignment:

> *' When I did Geography... I had to do some work [on the Internet] on volcanoes ... but the volcanoes just went on and on and on about absolutely everything so I had to keep refining it until you get down to what you want. It took me a couple of days, in fact I gave up and I still haven't handed the work in. I was just so mad with it. It was hopeless - or I was. '*

Pam expected to find the information for her assignment on the Internet, but experienced frustration and failure. Many explanations and solutions might be proposed. Perhaps her IT and information skills were deficient and she needs information skills training? Perhaps her frustrations were simply an inevitable part of learning and she needs support and guidance so that she develops more confidence and competence? Others might question the nature of the assignment and ask why Pam was asked to search the Internet, apparently unaided, to research the topic of volcanoes – are there no adequate Geography textbooks on the subject? The real-life experiences of Pam and other learners and teachers provide a counterbalance to some of the overwhelming enthusiasm surrounding the Internet. The electronic information world offers much that is positive and beneficial to learners, but it is nevertheless important to be a little more cautious than the popular 'hype' would suggest.

---

[1] IMpact on People of Electronic Libraries, http:// ilm.unn.ac.uk/impel

Views of the electronic information world

If we want to understand teachers' and learners' experiences of the electronic information world, it is important to identify their conceptions of it. One key feature is that the electronic information world (represented mainly by the Internet or the World Wide Web) is seen as extensive, comprehensive, perhaps even infinite. A library, or a set of encyclopaedias, however large and daunting the building or the ranks of bound volumes, has clear physical limits. People seem to have more difficulty in conceiving of limits in virtual worlds. It was not uncommon to find interviewees referring to the Internet using terms such as 'huge', 'unlimited' , 'information from everywhere' (HE study) and 'loads of information', 'everything is on there' (School study). This can be an enticing prospect and the excitement of finding highly valued information is clear:

'I found loads of stuff for my Third World project in Geography. There's so much, it was great and I managed to put a really good project together' (School Study)

'We find generally that ... students are very IT literate and very good at going to find this information ... and they get it from some surprising sources at the end of the day! ... in the final year especially, our course work specification is – Impress us! – and they go away and do that.' (HE Study Academic)

On the other hand, despite the expectation that all information is out there, information is not always found. This can lead to the kinds of frustration which Pam experienced and which may just as easily be experienced by Higher Education students:

' ... there's a great level of frustration when students have spent two hours and they haven't found anything. Because they expect something to be out there and it isn't always out there' (HE Learning Support Staff).

Learners may interpret this as an indication of their own inadequacy:

'I told you I was a bit stupid. I made a bit of a mess of that. I bet there's loads of stuff on there I could have used' (School study)

Evan academics, seeking information for research purposes were not immune to the same kinds of concerns:

'The main problem that I find is [getting] the feeling that I have searched thoroughly enough. If I had phrased my search in another way, would I have uncovered the things that I have in fact missed ?'

Another learner response was to assume that if their searching of electronic information resources did not turn up the required information, it was because the information simply did not exist, and they stopped trying to complete that learning task:

'I think the danger is that you become reliant upon simply using the technology assuming that if you enter certain key words and nothing comes up, it isn't there.' (HE Academic)

The electronic information environment is not only frequently perceived to be extensive and comprehensive, but is also seen by many students as 'fun', 'new' 'easy' and 'quicker'. Because of this combination of positive connotations, one academic felt that the Internet was seen as the 'Holy Grail', whilst a member of Learning Support staff commented:

' [Students] will say to me quite categorically, they don't want books, they just want it up on the screen, you know, and if they can't get it up on the screen they are not interested.'

In the Higher Education case studies, concerns emerged about the view of the electronic information world as all-encompassing. For example, one academic felt the need to explicitly caution students about some obvious limitations:
'I advise them to use the Web [only] as an extension of the library because anything published before 1990 is unlikely to be on the Web in my subject area unless it's absolutely fundamental.'
Other, more subtle limitations, such as the culturally restrictive nature of the Internet identified by Selwyn (1999) might be even less likely to be recognised.

Coping with electronic information

In both school and higher education contexts, learners' abilities to cope with the vast amount of information available to them was an issue of concern:
'...we tend to find that students are not very good searching for things and tend to have massive information overload on their searching strategies' (HE Learning Support Staff)

According to some views, such difficulties indicate a lack of information skills. For example, one of the school students seemed to view problems with searching on the Internet as mainly being about ' how to use it':
'... nobody really knows how to use it properly. ... they give you Yahoo straightaway and it's not really a very good search engine for educational things, it's more like for leisure and movies and stuff like that. I think that it's good that we've got the Internet because we can look for more stuff and probably find more information out but it's not really set up good. ... I don't think a lot of people understand it enough to be able to know what they're looking for and know how they're using things.'

There is an extensive literature on information literacy (Behrens, 1994; Bruce, 1999). A number of lists of competencies, and information seeking models can be found (for example, Dupuis, 1997; Kulthau, 1997; Taylor & Laurillard, 1995). In our research, a variety of approaches to helping students develop information skills were reported, some rather unstructured and reliant on 'learning by doing':
'...they have essays, long submissions, to write and they are not really told where to look. They are told to go away and look at a search on BIDS and Medline and their textbooks, and to come up with things on that basis. They are not given any specific guidelines for a particular project, usually, and what they come up with is up to them' (HE Academic)
More extended information skills courses were also discussed:
'[In the] second year modules where we are turning students into researchers and preparing them to do their dissertations, they have these sessions run by the library telling them how to use the library properly and that covers electronic and non electronic sources'

For HE staff, information skills were not only needed to deal with the amount of information available but also its variable quality. They often believed that students' limited knowledge of the field of study would affect their capacity to discriminate and evaluate:
'... because you've got the Internet, you are, obviously, now able to find an awful lot. That brings with it the associated problem of 99% of that is total rubbish. And how do you [as a student] sort out which bits you want when you don't know the subject?' (HE Academic)
There is some research to suggest that students are at least aware of the need to question the quality of information found on the Web (Hall & Dalgleish, 1999). Even school students in our study at times questioned the quality of information:
' on the Internet I think it's more what people put in as themselves than what actually happened – like they might be supporting a view or something'

Approaches to teaching

It might be thought that the availability of extensive information resources would transform teaching approaches. Some lecturers gave examples:
'It becomes much easier to make it more student-centred because the students have much easier access to this data than they used to. We can put the onus for finding out what is most useful and what is most up to date on them because they are becoming used to the fact that it is out there in an electronic form'
However, in other cases, lecturers espoused the benefits of access to information but adopted pedagogic strategies which limited the need for access:
'[In the] first year, it is all neatly packaged and fairly straightforward. There is not much they can't actually do from the lecture notes and the text books that they have ... and the same is true for the second year'

Academics sometimes explained this approach by reference to students' inadequacies, such as a lack of information skills:
'what we have found is that students are not really highly developed at being able to extract information out of other sources.'
Other student deficiencies were also proposed. For example, one lecturer suggested that it was only the more able students who could be expected to use extensive information resources:
'I think the students who tend to use [electronic information successfully] are the more resourceful and probably the brighter students ...'
Others commented on students' inability to work independently:
' ... perhaps the majority aren't capable of taking significant responsibility for the choices what to read, where to go, which is the problem when you move away from text books and recommending videos. It's a problem when you hit the Internet.'
Yet others referred to lack of motivation towards 'real learning', perhaps compounded by time pressures:
'The vast majority of undergraduate students don't want to work at a high intellectual level, hoovering all the information then think about it and make up your mind'
'The students don't seem to go to what I direct them to, let alone go beyond that! I don't think the students tend to read around. I think that they may be very pressed for time with their assignments.'

In some cases, lecturers did not refer to student deficiencies but saw it as an essential part of their role to present the necessary information and protect students from information overload:
'The function of a lecturer in my mind is to go out into the literature and find the information that is needed for the particular course that they are on, and distil it out of the literature and I think that the lecturer shouldn't send students out to try to find most of the information on the course. ... the lecturer's job is to do that and pop the information up for the students'
In contrast, for other lecturers it was an essential part of their role to help students to cope with diverse information:
' ... part of the learning process is to acquire and analyse information'
' obviously you have to learn how to discriminate between what is useful and what is not ... it's my role to teach students how to discriminate between the useful and the not so useful.'

Approaches to learning

Academics were concerned about the impact of the electronic information world on student learning:

'I think, the ability to get a huge amount of information is quite good – can be quite astounding. But I do feel that sometimes it can be very distracting, and ... I find that people are beginning to confuse the fact that they've got a lot of information – they're putting it together – with actually understanding that information.'

Other lecturers commented on the use of material from electronic resources with very little active transformation:

'They do a cut-and-paste job ... it's all in completely different prose styles and some overlapping of content. And some bits are completely irrelevant and shouldn't be there. ... Some of it's good but some of it comes from just one or two sources. They stick this down and it's supposed to suffice as an assignment'

'At the moment we would say right, give me a 5000 word essay on landslides and we would get huge chunks of it back the same from everybody because they have just found landslides in the netsearch and found some geological survey reports on landslides and away they go.'

It may be the case that the availability of vast amounts of electronic information reinforces the idea that knowledge is 'out there' to be grabbed rather than needing to be used actively and internalised. However, we also need to consider that students are responding to the particular context in which they find themselves (Prosser & Trigwell, 1999). This is well-illustrated in the extract from an interview with a school student:

Student: *Well, I needed to find ten facts about him [Martin Luther King] and I've got ten now so that's enough.*

Interviewer: *Do you think these are the most important facts?*

Student: *I don't know. I don't really care - my homework's done. She only asked for ten facts and I've got ten.*

This is a clear case of a reproductive, task-focussed approach but school students were not incapable of attempting to evaluate information and use it more actively, when they were engaged in activities which motivated them to do so. This was often outside the school context:

'It's usually quite trustworthy, but stuff, like American stuff and riding and stuff there's things that they do that you just wouldn't do in this country. It seems wrong that they are putting it on the Internet because, well, when you get off a horse you swing around the back. Americans keep one foot in the stirrup and step down. That's dangerous because if the horse pulls away you can get dragged, the Americans always do it that way, so I think that if you're looking to start riding and you started that it would be very dangerous.'

The key factor here is the approach to learning adopted by students. Deep approaches and interest in learning tasks afford more active engagement with information and the construction of knowledge, whereas surface approaches lead towards more straightforward reproduction of information to fulfil task requirements. Some contexts fail to encourage students to see themselves as active constructors of knowledge or 'apprentice knowledge workers' (Goodyear, 1999). This situation is not specific to learning in the electronic information world but it may be that the availability of extensive information leads to changes in the nature of learning tasks so that information gathering and re-presentation become emphasised at the expense of working with information to understand, evaluate, synthesise or apply. A lecturer in Economics, who noted the prevalence of reproductive approaches amongst students, suggested the need to change the nature of the learning task as a direct result of the availability of electronic information:

'We used to, for example, give them country profiles to do as an assignment – an economic profile of a particular country. But, with Datastream and other electronic sources, they can just simply download these without any input from themselves; therefore we have to ask different questions.'

Conclusion

If learners are to benefit from the potential of electronic information, the educational context needs to enable them to do so. The strategies adopted by some teachers eliminate the need for learners to access information independently. In addition, some learning tasks emphasise the gathering and re-presentation of information rather than working with it to understand, evaluate, synthesise or apply. Such tasks can become routine in the electronic information world and fail to engage learners in anything more than reproductive, task-focussed learning. In other cases learners may be disempowered by failure to cope with electronic information, a failure compounded by prevalent views that the information now available is all-encompassing and easy to access. Pedagogic strategies which recognise that students' need to learn to cope with information and support them in doing so through appropriate learning tasks will be beneficial in developing their capacities as lifelong learners.

References

Behrens, S. J. (1994) A conceptual analysis and historical overview of information literacy. *College & Research Libraries,* 55(4), pp.309-322

Bruce, C. S. (1998) The phenomenon of information literacy *Higher Education Research & Development,* 17(1) pp. 25-43

Department for Education and Employment. (1997) *Preparing for the information age: Synoptic report of the Education Department's Superhighways Initiative.* London: DfEE

Dupuis, E.A. (1997) The information literacy challenge: addressing the changing needs of our students through our programs. *Internet Reference Services Quarterly,* 2(2/3), pp/93-111

Goodyear, P. (1999) New technology in higher education: understanding the innovation process. pp. 107-136 in A. Eurelings et al. (Eds) *Integrating information & communication technology in Higher Education,* Kluwer-Deventer.

Hall, R. & Dalgleish, A. (1999) Undergraduates' experiences of using the World Wide Web as an information resource. *Innovations in Education & Training International,* 36 (4), pp. 334-345

Kulthau, C. C. (1997) Learning in digital libraries: an information search approach. *Library Trends,* 45(4) pp/708-724

McDowell, L (2000) *Learning and teaching in the electronic information world.* IMRI (Information Management Research Institute)Working Paper. Newcastle: University of Northumbria, IMRI : http://is.northumbria.ac.uk/imri

Pickard, A. J. (1998) The impact of access to electronic and digital information resources on learning opportunities for young people: A grounded theory approach. *Information research* 4 http://www.shef.ac.uk/~is/publications/infres/isic/pickard.html

Prosser, M. & Trigwell, K. (1999) *Understanding learning and teaching: the experience in Higher Education.* Buckingham: SRHE & Open University Press

Selwyn, N (1999) Virtual concerns: restrictions of the Internet as a learning environment *British Journal of Educational Technology,* 30(1), pp.69-71

Taylor, J. & Laurillard, D. (1995) Supporting resource-based learning in N. Heap et al (eds) *Information technology : a reader* , 4th edition. London: Pitman

A case study of Inter-Institutional Collaboration- A Tale of Two Cities?

By: D.McFarlane*, Dr. V. Cano** and K.Brown**
*Glasgow Caledonian University
** Queen Margaret University College
Correspondence: vcano@qmuc.ac.uk

Abstract.
This paper will discuss the extent to which institutions are ready for collaborative relationships and will consider the operational difficulties and complexities of communication between partners at an institutional level. The case will examine the relationship between members of academic staff at Glasgow Caledonian University (GCAL) and Queen Margaret University College (QMUC) within a collaborative research project in the area of web-based learning. Whilst this account presents merely the data of one web-based learning implementation, the nature of the problems suggest that they might not be unique across the sector.

1.- Introduction.

The initial contact for collaborative research emerged in January 1999 from an opportunely timed discussion on the use of technology in learning and teaching. Staff at both institutions were aware of the desirability of a collaborative research venture in order to enhance research capacity, seek external funding and to develop web-based teaching expertise. Staff at QMUC had experience in web-based module development and staff at GCAL had experience in case-based learning. It was felt both by the direct researchers and by their line managers that collaboration between both institutions could enhance each other's areas of expertise.

Before links of formal collaboration were established, it was considered important to identify areas of "shared vision" between the prospective partners. Wheeler et al (1995) proposed a conceptual framework for assessing the implications of collaborative activities and stressed the importance of a "shared vision". QMUC and GCAL both have specific policies that stress commitment to lifelong learning, use of CIT and facilitating access to educational material is evident in their strategic planning documents (GCU, 1993/4, 1991; QMUC 1997). Moreover both institutions have recognised the need to enhance the provision of educational material not only to students with a conventional profile but to facilitate the incorporation of direct entrants and mature students. This latter policy responds to the need to increase access to part-time students and mature students.

The analysis of the mission statements of the two organisations showed that they both had a similar vision for educational provision and very similar technological infrastructures. Policy statements of both specifically identify co-operation with other institutions as a way of exploiting the full potential of computer networks and the investment in facilities and training. Finally both HEI sought to attain a better allocation and use of financial and manpower resources and achieve cost efficiencies in encouraging remote access and distance learning. This convergence of objectives strengthened the case for a successful collaboration. The researchers were confident that this evidence of shared vision would provide support to embark on a collaborative bid for external funding to develop a web-based learning environment.

2.- The Project.
QMUC had developed a platform independent shell to host the development of educational resources across different departments in its two campuses. The shell supported:

- internal searching facilities,
- email,
- a conference space
- FAQ,
- textual material,
- graphics,
- full text access to selected readings within a digital library experience
- interactive booklets and
- links to related educational sites.

These developments were done through use of shareware. The applicability of the shell and its content had been tested within QMUC since 1997 on typical student cohorts of 150 first year students in the social sciences. The module sought to develop information literacy and research skills in first year social science students and was a core requirement for a number of first year students from several departments within QMUC. The web-based material was used in the first year as a supplement to face to face contact, and during its second year of implementation lectures were replaced with activity based seminars. This meant a gradual ease of face to face contact of lecture times and an increased use of face to face time in seminars supplemented by asynchronous group discussions through the conference space. The web-based environment and module were tested through questionnaire and focus group approaches (Cano, 1998). As a result of this evaluation, staff at QMUC wished to incorporate desk-top-video conference technology to facilitate synchronous communication at a distance, and therefore enhance its possibilities of delivery of this module on a completely distance-based mode.

GCAL's module sought to develop quantitative research competencies with second year students in the Business faculty. The module was also a core requirement for a number departments at GCAL. Lecturers at both institutions felt that the similarity in content of both modules would facilitate any collaboration in the joint development of a web-based learning environment.

In addition to the above, both staff at GCAL and QMUC felt that industry demands increasing flexibility from graduates to operate in a distributed environment. Students have to graduate with sufficient information and computer skills to be able to work and co-operate at a distance. Teleworking and teleco-operating via diverse forms of GroupWare is a reality for innovative information intensive industries in Scotland. It was felt that students needed to be aware of this new reality through their learning experiences in HE. In other words, students needed to tele-learn in order for them to tele-cooperate and tele-work in their future working life.

A bid for a project that involved students at both institutions to work in groups and tele-cooperate via desktop video conferencing within a case-based educational scenario was successful in attracting external research funding. The funding made provision for the purchase of 2 DVC suites, a server and research assistant support.

3.- Challenges in Implementation.

After the funding was confirmed the first step was to specify the requirements of the DVC labs. This was done through co-operation with a member of staff from another HEI who was also a project leader in web-based learning environments. The hardware and software specifications were completed via video conferencing and purchase orders were made.

It was at this point that the real issues began to arise.

3.1.- Quality Assurance Problems.

Both institutions were undergoing major programme reviews. The review within QMUC was a routine programme-wide quality assurance procedure. The Faculty of Business at GCU as part of a review provision was being restructured and there was suspension of new module development until the structure and governance processes were finalised. Both researchers had to revalidate the modules with the new ICT provision in order to satisfy institutional quality assurance requirements. Since there was a large number of students taking part in the project (150+) it was essential that the outcomes for each group of students were considered by programme boards, subject quality groups and academic standards – all of which took time and no inconsiderable effort preparing the appropriate paperwork for each submission.

The schedule of the validation procedure at both institutions slowed the project as web-based content could not be developed until the validating exercise was finished and the prescribed content approved. This was not a major problem but it added to the administrative load of the project and more significantly, it added a measure of insecurity to the future validity of the research results as a number of departments in both institutions could opt out of the module as a result of the programme changes. A significant reduction in the number of students that would matriculate in the new ICT enhanced modules could compromise the validity of the research.

The modules got validated through all the appropriate bodies and groups and although the original student numbers were reduced the final cohort (80+) was large enough not to compromise the project. However the project group went through significant stress.

3.2.- Technological Problems.

Due to policy decisions made at GCU between the initial bid and the confirmation of funding, the original specification for the first test workstation was inappropriate. The university had changed its policy towards an integrated IT system and had taken the decision to move to Windows NT. Although the workstation was functional, additional peripherals were needed in order to interact successfully with NetMeeting, the software chosen to manage the DVC. Similarly, once the other workstations arrived, testing begun prior to the arrival of students. It soon became apparent that the purchasing unit at QMUC had accepted equipment below the required and previously accepted specification. Amends were made and further peripherals purchased and installed to make the units operational. This added delays and frustration. These two examples show that the ITC policies both in purchasing, and in overall infrastructure development were taken with no regard for research projects which depended on compatibility across systems. The life of the project required interaction with a number of units across both HEI and there were obstacles in each turn.

Staff at both institutions had planned on the launch to the video conferencing activities through a ceremonial kick-off at both HEI large video conferencing facilities, with all the students (80+) present. This could not be done although rescheduled at two occasions because the GCAL suite was not installed on time, and during the second try, students were called off on another module to attend the presentations of a Master Chef (they are tourism and hospitality students). There was no major educational loss here, but again frustration at the lack of co-ordination on unit installations and availability with the faculty needs became evident.

3.3.- Housing Problems.

The DVC suites had to be placed within accessible areas to the student populations, but also within secure areas, due to the perceived novelty of the equipment. Requirements for security were specified at the time of the purchasing. However, this requirement got caught within a Faculty reallocation of space within QMUC. Space was allocated within a secure area but below the specifications required in wait of the permanent location. The office of the DVC unit got broken into and some minor equipment stolen. Throughout the search for permanent housing for the DVC unit, the project now was dealing with "estates". This administrative unit was aware of the requirements specified and although sympathetic to the problem could do very little until full approval and costing for the building of the permanent location were given.

4.- Lessons Learnt.

A web-based learning research project interacts per force with quality assurance procedures, curriculum development bodies, IT facilities, procurement mechanisms, library, registry and the student body. A simple implementation quickly brings to light infrastructural fissures in practically every aspect of the HE institution involved. By the nature of its development web-based learning projects require the co-ordinated approach of many different sections within the university, and when this integration is lacking, there is the impression that the left hand does not know what the right hand is doing. Projects suffer from the lack of integration, particularly between the IT departments and Student services departments.

It would be unfair to suggest that support was not offered in this project. In most of the situations encountered the problems were solved with the goodwill and extraordinary effort of many people. Whilst none of the problems were insurmountable the sheer number of irritations serve to illustrate that there are issued to be addressed. It is worth noting that whenever issues arose regarding the overall strategy of the HEIs or the spending of resources, it became much more difficult to achieve a satisfactory outcome.

At the proposal stage it had been obvious that both institutions were of a similar mindset- they had both identified mission statements which identified and encouraged the development of alternative sources of access for students. Both deans had been enthusiastic about the project right from the start. The promises of resources were real and have for the most part been delivered. None of the problems could have been foreseen and if viewed in perspective could not be said to have halted the project. However, each of these points are evidence of lack of a favourable environment to support web-based implementations.

Web-based learning projects are somewhat innovative ways of teaching whether single institution based, or collaborative based. By nature of the technology they use and because they integrate a multiplicity of resources they impact across practically all other sections and departments across the campus. Face to face teaching does not require these high levels of infrastructural integration. HEI's are geared to support face to face teaching and learning and their infrastructures and procedures reflect this face-to-face approach. The policies speak of increased access, strategic alliances, collaborative development and collaborative research, however the practices do not yet reflect the strategic visions nor allow for a seamless approach to web-based learning.

Bibliography

Cano, V. (1998). Measuring the organisational impact of a web-based information literacy module: a study in organisational culture. OnLine Educa Berlin. December 2-4, 1998. Bonn, Where and How. 296-298.

Glasgow Caledonian University. University Strategic Plan. June 1996.

Queen Margaret University College. Strategic Plan 1997-2001.

Wheeler, B. et al. (1998) A Framework for technology-mediated Inter-Institutional tele-learning Relationships. Available at:
http://www.ascusc.org/jcmc/vol1/issue1/wheeler/essay.html

POSTER PRESENTATION

An Exploration of Language Use in the Context of CMC

JANE MILLER, ALAN DURNDELL, MIKE WRENNALL & TERRY MAYES

Department of Psychology, Glasgow Caledonian University, Cowcaddens Road,
Glasgow, G4 OBA

E-mail: *j.miller@gcal.ac.uk*

Abstract

The purpose of this poster is to outline emerging work that is being undertaken at Glasgow Caledonian University to incorporate learning technology into an element of the first-year introduction to psychology module. Currently, for the initial pilot study, computer conferences have been set up for the students and their task is to generate ideas relevant to their essay topics and discuss them online. The students that participate in the online discussion groups are awarded bonus marks for their essays, depending on the extent and quality of their contribution. It is hoped that during the course of the investigation, the study will be repeated a number of times using a different sample of introductory psychology students each semester, with roughly fifty students in each sample. The learning strategy that has been adopted in this investigation is based upon constructivist and socio-cultural learning principles.

The focus of the first part of this investigation is on the exploration of language use in the context of computer-mediated communication (CMC), with regard to stylistic usage, rhetorical and linguistic strategies and patterns of variability and consistency in the content and form of the discourse. The consequences of using a particular style will be examined. Particular attention will be paid to gender differences in linguistic style and participation. If gender differences are found to exist, this has implications for the composition and effectiveness of learning groups in a CMC context. As CMC is becoming increasingly established as an important medium for teaching and learning, so there is a need to understand and manage this medium so that its learning potential may be optimised.

The rest of the investigation will explore the ways in which groups communicate online, addressing issues of group function and process as they occur in a meaningful setting. The relevance of established frameworks of group dynamics for examining the interaction in online discussion groups will be examined. Videoed focus groups and questionnaires will be used to investigate participant attitudes about group behaviour and the construction of learning relationships online. The potential usefulness of the conference transcripts as tertiary courseware will also be examined. The research takes on a naturalistic perspective and mainly uses the qualitative methods of ethnographic observation and discourse analysis. However, some quantitative methods will also be used, e.g. to examine rates of participation.

Learning using Virtual Shared Workspaces

Gerardo Moënne, Sally Barnes, Rosamund Sutherland
Centre for Learning, Knowing and Interactive Technology
Graduate School of Education
University of Bristol

1. Introduction

New technologies are rapidly being introduced into the market and with them come social and political pressure to introduce them into schools. Every new technology is expected to change dramatically the whole learning process therefore their effects tend to be studied in isolation from other tools already in use. Nevertheless, in practice, no single tool has shown itself capable of making a revolutionary change and every new tool is used in conjunction with existing tools. Hence, we believe that every new technology is a gateway to new teaching and learning possibilities and its use is affected by, and affects, the use of tools already in use. Therefore, research should take an holistic look at the whole range of tools, and their use, rather than exploring single tools in isolation.

We consider video communication and the ability to share an application to be two of the emerging technologies that, in the near future, will be massively adopted by schools and education programmes. We have reason to believe that providing these new possibilities, for students and teachers, who are already overwhelmed by the set of alternatives, will not be as smooth as with other technologies (Cifuentes, Beller, & Portela, 1999).

The purpose of this paper is to present the work carried out at our centre. This work explores both the effectiveness of distance support for teaching and learning processes and how learners develop the skills to exploit the technology and become active members of an online learning community. The study takes an holistic approach to the use of new technologies, considering the interaction of the learner with a number of tools. This approach is based on notions of distributed cognition and affordances.

Firstly, the theoretical background that supports this work is presented. Secondly, the theory is applied to analyse an electronic conferencing system as an academic support tool for students. The issues raised are used as a basis to reflect about what happens when video communication is added to the virtual shared workspace. Thirdly, an initial study is described and some conclusions are drawn from this. Finally, a summary of the main issues discussed is presented accompanied by a description of future work.

2. Theoretical background

Theoretically the study takes the position that learning occurs within a socio-cultural framework (Vygotsky, 1978; Wertsch, 1991). Two elements of this theory are crucial here. First is the idea that learning occurs first on an intermental plane (i.e., social) and then on the intramental plane (i.e., internal to the individual). The second idea concerns the zone of proximal development which is the difference between what individuals can do by themselves and what they are capable of doing with the help of tools, signs or more expert individuals. In this way, learning can be seen as occurring through an active interaction with tools, ideas and other people.

Although we normally consider that the capacity to perform an activity (Rogoff, Radziszewska, & Masiello, 1995) lies within an individual, the means and resources that enable an activity to be performed are distributed between people, environments and situations. According to Pea (Pea, 1993) the world is shaped by the intelligence "left behind" in artefacts, conventions and practices by past generations' activities. Therefore, when we use

252

a tool we are, in a sense, enhancing our intelligence by borrowing the intelligence of the tools. Distributed cognition theory deals with issues of how this aggregate intelligence is used and organised between the different actors.

Since we are interested in the cognitive processes involved in the activities performed by the person and his surrounding we will use the term coined by Perkins (Perkins, 1993), person-plus. According to Perkins, people normally use tools, situations and other people to perform an activity. This combination of the individual plus elements of his/her environment is called person-plus. We believe that when an individual is communicating with others through certain technology, he or she is relying on the communicational cognition embedded in this technology. The individual enhance his/her communicational intelligence by adding communication tools to his person-plus. We are interested in the skills involved in this process, and in how the environment can help the learner to acquire them.

A second concept we use, to help us as a comparison framework for the different technologies, is the notion of affordances developed by Gibson (Gibson, 1966, 1979). The original theory was concerned with visual perception and how individuals learn to notice and perceive what an object affords, or allows the individual to do with it. Using this notion, we can compare different technologies by considering potential affordances for users. In these terms, for example, electronic mail and electronic conferences can be compared by their communicational affordances.

Finally, we use the term virtual shared workspace (VSWS) to refer to the different combinations of collaboration tools that can be involved in a distance communication process. The term 'shared' implies that the other person has the same kind of tools available. There are two levels of sharing: one when both individuals manipulate the same virtual object e.g. working on the same spreadsheet. At the second level, we share at a conceptual level; there is a common virtual space that everybody in a group can access even if using different systems e.g. electronic conferences. The sharing is in the objects rather that in the environment. This concept helps us to characterise the interaction of the individual with different tools and the interaction between tools. For example, we can talk about the affordances of a VSWS or we can study the affordances of a VSWS with and without certain tools.

3. Applying the model

So, let us see how we can characterise an electronic conference using this framework. In general, an electronic conference will have a certain number of members interested in a particular topic. The main features of this kind of VSWS are to: send and receive messages, reply to a posted message, send files attached to the mails, read and write at anytime, and, in many cases, to protect identity behind an alias. In terms of affordances, the electronic conference allows communication between an individual and a group. This communication is asynchronous so it does not require the immediate participation of the other. Another affordance is the possibility of maintaining anonymity. Anonymity may allow some individuals, who would not feel able to contribute under their own names, a way of participating without risking their identity. The effect of allowing anonymous users may reduce the "lurking" effect often reported in electronic conferences. In terms of the distribution of cognition, the individual knows whom he wants to communicate with, and what he wants to communicate. He relies on the system for sending and receiving messages, checking spelling, delivery and addressing and storing messages.

We are using an electronic conference system called FirstClass (FC) to support a group of students. Although these student are not actually at a distance, due to their different activities and study regimes, it is difficult for them to get together outside class hours. In our work using FirstClass, we have had great difficulty developing a critical mass of users over a period of time. What we are finding is that there is initially much but, after only a few weeks people find that it is difficult to sustain the discussion over time, and the conference lapses. Where our use of FC has prospered has been when the use of the conference was made a mandatory component of the course and when certain documents and assignments were only sent electronically.

As other researchers exploring conferencing systems (Pearson, 1999, 2000) have stated, we find that:

- Group dynamics are crucial for effectiveness of communication
- Many people 'lurk' on conferences – reading what is posted but not contributing
- Social cohesion of the group is very important. For educational purposes, knowing other group members seems to give people more confidence to participate in conferencing systems.
- There must be a real need to communicate through conferences. When people have the opportunity to meet face-to-face, they are less likely to use a conferencing system.
- Someone needs to mediate and keep the conference going.

When we add video communication and application sharing to the VSWS of the learners the first question is if they will be able to incorporate these new tools into their person plus. This is likely to depend on the affordances the individual can see within these new technologies, compared with the ones his current VSWS already provides.

In theory, perceiving the affordance of the current system for an individual and the potential affordances of a new technology could allow us to predict the future level of use of that technology by that individual. Even if this were possible to do, it would only be true for the initial time, since the interaction with the new technology will also affect the affordances of the initial technology and this change will affect the affordance of the new technology and so on. Therefore, we must consider the system of available communication tools as a dynamic set. The next paragraph is an attempt to reflect on the possible effects of the massive introduction of video communication and application sharing to communities of learners already using other technologies.

On the one hand, the communication potential of video conferencing and the ability of application sharing to allow two people to discuss over interactive media such as, for example, shared text, diagrams or spreadsheets, should lead to a major increase in the level of electronic communication, and a feeling of more natural communication. On the other hand, these two technologies require both individuals to be connected at the same time. Therefore, to be able to use these technologies some previous coordination is needed. In addition, having their image on the screen means the end of anonymity, which is one of the favourite affordances of electronic communication for many people.

As we have said it is our belief that tools should not be studied in isolation because their use affects the use of other tools. For example, people could start sending video messages as attachments because of their knowledge and interaction with a videoconferencing system. This residual effect will be ignored by a video communication study that does not consider the whole set of tools used by the student. In this case, the individual becomes aware of the technology's affordances through his interaction with another technology. Maybe, in this case, the ideal for the user would be to enhance e-mail to be able to send video messages more easily and not use video communication.

Some of the questions we will address in our work are:

- How does synchronicity affect both the communication habits of the users and the level of use of communication tools?
- How does seeing each other's faces modify the social relationships within a group?
- Does the use of these technologies solve any of the problems observed in electronic conferences?
- How is cognition distributed between the individual and the virtual workspace?

4. A Case study

Currently we are running an initial experience aimed at studying the potential of a VSWS that includes text-based chatting, video communication and application sharing, as a distance teaching learning tool. The idea is to observe these technologies in a distance tutorial setting i.e. informal or semi-informal individual or small group communications.

This study is part of a project aimed at exploring the use of dynamic geometry software to help develop the notion of proof in A-level students[1]. The subjects of the project are five seventeen-year old students from a comprehensive school in the Southwest of England. The project includes seven face-to-face sessions of 1 hour and 45 minutes each at the school followed by the development, by the students, of an individual project. During this final stage, students are being supported by distance tutorial sessions with tutors from the University of Bristol. In addition, students will discuss their projects through a final presentation at a distance.

Before the start of the distance tutorials, training was given to the tutors. The idea was to simulate the tutorials including the use of all the possible tools and most of the technical problems they could face. At the end of the process, tutors were much more confident in their abilities and new skills. In addition, very valuable technical experience on how to configure the equipment and arrange the different windows was learnt in these training sessions.

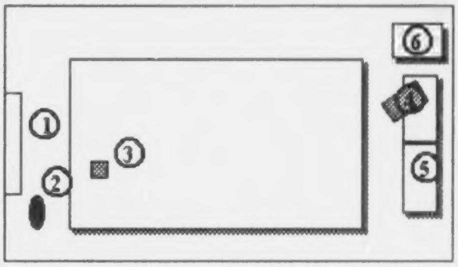


Fig: 1 School Setting

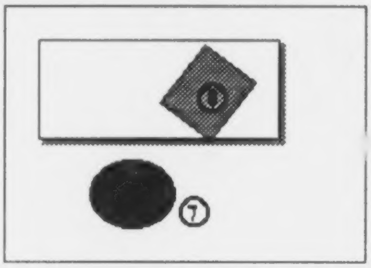


Fig. 2 University setting

The distance tutorials were performed using a computer-based program at the university and a stand-alone videoconference equipment at the school, connected through an ISDN line. The tutors had two video images, their image and the school one, available on the screen. Since the connection did not include data sharing, it was necessary to use a flip chart (1) for the student (2) to draw the geometrical diagrams and equations being discussed with the tutor. A microphone (3) was placed on the table near the student. The student (2) stood beside the flip chart in front of the table. A long table separated the flip chart from the camera (4) and the two monitors (5) where the student could to see the tutor and his own image.

In the case of the university tutor (7), the camera was on top of the computer monitor (8). The school camera was mainly focused on the flip chart and the student while the tutor camera just showed her face. The tutor put the window with her image on the top-right hand corner of the screen using the rest of the screen to show the incoming images. There were other people in the rooms in charge of the technical issues.

We chose to hold individual tutorials since the students were carrying out individual projects. Each tutorial lasted around half an hour and was carried out in an unstructured way. A typical session started with a brief introduction of the setting for the student, followed by a student's presentation about what he or she had done. This took between 10 and 15 minutes and included geometrical diagrams drawn on the flip chart and the development of some equations. Normally the tutor did not intervene at this stage except to ask for clarifications or voice's raising. Then, the student established his or her main doubts or problems preventing him or her for going on with the project, through a dialogue with the tutor. After responding to the student' doubts, the tutor tried to orient his ideas towards a concrete project. This last part usually included some discussion over diagrams.

---

[1] This project is actually being carried out by: G. Moënne, C. Mogetta, F. Olivero & R. Sutherland, Graduate School of Education, University of Bristol.

As we have said, tutors received basic training in video conferencing techniques. On the contrary, students were completely new to this technology. We were impressed by the way in which students behaved, considering that this was their first experience with videoconferencing. They were all confident and natural when speaking to the camera. The ones that were talkative and clear in the face to face situation were talkative and clear in their video presentation. The student who garbled his words during face-to-face sessions also did it in the distance tutorial. For a wider view about related issues, see (Doherty-Sneddon et al., 1997).

All the students agreed that discussion over a diagram could have been easier with some way of sharing the dynamic geometry software. Their opinions about the difficulty of working at a distance ranged from "it was not so difficult" to "it is the same". The level of perceived difficulty has more to do with personality issues than with other matters.

The video analysis showed a high number of times where the tutor was pointing and dragging with the fingers on the diagram in the video screen. Sometimes the tutor was using the pointing and dragging as a tool for thinking about what the student was saying. However, most of the times she really meant to point to an object thinking that the student could also see it. Usually this action was accompanied with a phrase like "This point...", "This is an ellipse.." or " On this line...". A first observation is that our particular VSWS was lacking tools for this important communicational element, namely pointing. This behaviour decreased after reviewing the first session.

One of the factors that perhaps contributed strongly to the success of the distance tutorials is the fact that students already knew the tutors from the face-to-face sessions. Some evident consequences of this were that there was no need for introductions during the sessions and the informality of the face-to-face sessions was translated to the distance tutorial.

Sometimes the setting of these technologies can create artificial environments that do not work in a natural way, hence confusing the user. For instance, although a student had the microphone only half a metre away from him, having the voice and image of the tutor coming from the monitor in other side of the room, made him think that he had to speak loudly as if to a distant person. This issue raises the question of what is more valuable, from the learning point of view, to teach the learner how to work in these 'unnatural' conditions or to arrange the setting in a more natural way. For the time being, we are trying a more natural setting but this is still an open question.

Although most of the videoconferencing literature highlights the importance of eye contact (McKillop & Lee, 1998), during our sessions eye contact was established only on a few occasions. This was because the focus of the discussion was the geometric diagram on the flip chart. Subjects did not seem to care about eye contact when they were focusing on the diagram. All students, to some degree, looked at the tutor when she asked something but very few turned to look at her when explaining the diagram. This is similar to two people working side by side on a mathematics problem not looking at each other but talking through the common construction. Therefore, we suggest that in this kind of setting, where the focus is on a mediating object, the eye contact rule does not apply.

In a face-to-face conversation, we do not see the image we are presenting to the other person. Therefore, it is difficult when what the other person sees is just part of what you are presenting. This is the case of video communication where you must be aware of this effect. In our experiment, users tended not to look at their own images. Many times either the tutor or the student used their hand to point to things outside the frame of the camera, without noticing that the other person could not see these things. Therefore, people need to be trained to be aware of the frame of the image that it is actually being communicated to the other side. In this case the technical support is there but people do not use it. The tutor, who received some training, was much better at this but it is something that takes more time to get used to.

At the time this paper is being written, only one round of individual tutorials has been run and due to technical problems, just the video/audio connection could be established. Although this left us with just video and audio based communication to study, interesting conclusions are being drawn from the experience.

First, the experience was easier for the tutor and students than they expected. Generally, people were surprised at how naturally it was to interact through the technology. There is a general perception that video communication is more complicated to perform.

The rehearsal phase was crucial in building the tutors' confidence with the technology. They gained confidence by simulating and rehearsing the actual learning situation. In this stage, many set-up details were sorted out, which helped the fluency of the tutorials.

The teaching and learning aims of the tutorials were achieved. Students clarified their doubts and tutors were able to take students' initial ideas and guide them towards a 'realisable' project. Nevertheless, the need for using other tools, such as application sharing, was evident. For example, the tutor frequently spoke and pointed to the image of the diagram. Image that the student could not see. In addition, confusion about the name of a point, a person was referring to, arose at some moments. This might have been overcome by using a chat facility.

5. Summary and Future work

In order to study learning processes mediated by different communication tools we have chosen to use the following theoretical constructions: person plus, affordances and virtual shared workspace. The notions of person plus and affordances enable us to study people interacting with cognitive tools with the set of tools being referred to as the virtual shared workspace. In applying this framework to electronic conferences as an example of virtual shared workspaces a number of issues arose such as: participation is not automatic, group cohesion is crucial and the 'lurking' effect.

The introduction of video communication and application sharing is expected to solve or reduce some of these problems. Nevertheless, it is also expected to bring new problems. In order to explore these potentialities and drawbacks a first study was set-up. Although, video communication affords a more natural and very fluent interaction, we believe that its sole use is not enough to ensure effective communication. This is particularly the case when mediating elements such as diagrams are an integral part of the communicative activity.

In the near future, the present study will be extended by incorporating the use of chatting and application sharing tools in order to develop more understanding about their potential for teaching and learning mathematics. In the long term, two main modifications will be introduced: the introduction of these technologies to learning communities with a high previous use of other electronic communicational tools, and collective tutorials and discussions will also be explored.

6. References

Cifuentes, L., Beller, C., & Portela, J. (1999). Integrating desktop videoconferencing into middle school classrooms and teacher education. *International journal of educational telecommunications, 5*(1), 79-91.

Doherty-Sneddon, G., Anderson, A., O'Malley, C., Langton, S., Garrod, S., & Bruce, V. (1997). Face-to-face and video mediated communication: A comparison of dialogue structure and task performance. *Journal of Experimental Psychology: Applied, 3*(2), 105-125.

Gibson, J.J. (1966) *The senses considered as perceptual systems*. Boston: Houghton-Mifflin.

Gibson, J.J. (1979) The *Ecological approach to visual perception*. Boston: Houghton-Mifflin.

McKillop, S., & Lee, M. (1998). *Using Video Conferencing to Support Distance Learning: A Staff Development Course* . Belfast: The Queen's University of Belfast.

Pea, R. D. (1993). Practices of distributed intelligence and designs for education. In G. Salomon (Ed.), *Distributed cognitions: psychological and educational considerations* (1st pbk. ed., pp. 47-87). Cambridge [Cambridgeshire]; New York: Cambridge University Press.

Pearson, J. (1999). Electronic networking in initial teacher education: is a virtual faculty of education possible? *Computers & Education*(32), 221-238

Pearson, J. (2000). Lurking, anonymity and participation in computer conferencing. In D. M. Watson & T. Downes (Eds.), *Communications and networking in education* (pp. 79-89): Kluwer Academic Publishers.

Perkins, D. N. (1993). Person-plus: a distributed view of thinking and learning. In G. Salomon (Ed.), *Distributed cognitions: psychological and educational considerations* (1st pbk. ed., pp. 88-110). Cambridge [Cambridgeshire]; New York: Cambridge University Press.

Rogoff, B., Radziszewska, B., & Masiello, T. (1995). Analysis of developmental processes in sociocultural activity. In L. M. W. Martin, K. Nelson, & E. Tobach (Eds.), *Sociocultural psychology : theory and practice of doing and knowing* (pp. 125-149). Cambridge [England]; New York, NY, USA: Cambridge University Press.

Vygotsky, L.S. (1978) Mind *in Society: The development of higher psychological processes*. Cambridge, Mass.: Harvard University Press.

Wertsch, J.V. (1991) Voices *of the mind: A sociocultural approach to mediated action*. Cambridge, Mass.: Harvard University Press.

Romanian universities face to the networked learning reality

Cristina MOHORA, Constantin ISPAS, Miron ZAPCIU
POLITEHNICA University of Bucharest, ROMANIA

1. Introduction

This paper reports some of the findings and problems of a ODL Socrates project which is conducted in the POLITEHNICA University of Bucharest and is entitled: ***"FAVIR-international virtual network for the future enterprise.***

The virtual network ***FAVIR*** founded in 1999 between **4 organizations in Europe (3 universities and one organization specialized in multimedia and new technologies)** will improve the relations and experience in the networked learning between **Greece, France, Italy and Romania**.

The object of the project is to integrate the partners, the pedagogical experience specific to each of them and to disseminate ideas and experiences in the networked learning (favir@egroups.com). The fields of activity are very important because they define a virtual network, which correspond to the virtual enterprise principles.

Politehnica University of Bucharest (figure 1) was founded in 1818 and it is the most great and important technical university in Romania. The university contains 12 technical faculties in all the fields of activity and has 25 000 students, 630 postgraduates students and 1800 Ph.D. students. Teaching process is sustained by modern equipment and materials, the most parts of them financed by international project like Tempus, Leonardo da Vinci, Erasmus-Socrates, etc. or financed by contracts with Romanian Ministry of Industries and private companies from Romania. Also, we benefit of the donations from important companies like: Siemens (Germany), Mazak (Japan), Autodesk (UAS), AT&ISTEL (USA), Digital (USA), National Instruments (USA), FESTO (Germany).

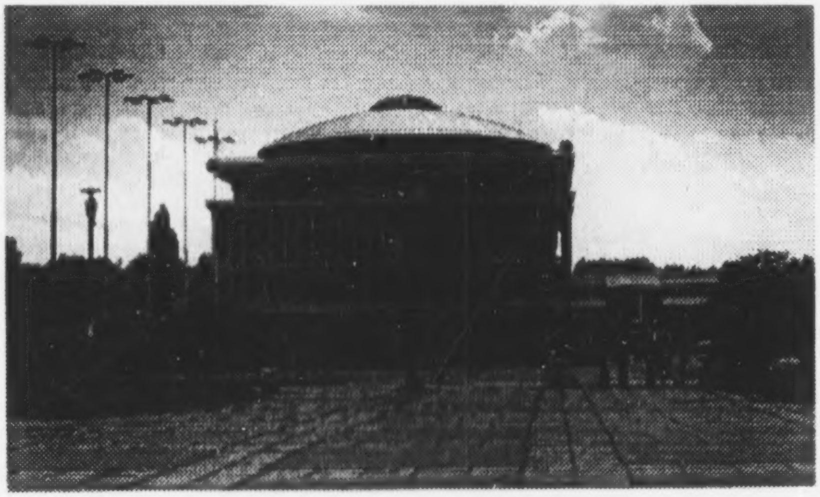


Figure 1. Politehnica University of Bucharest

Nowadays, when the economic and industrial sectors are continually changing, the students have to be prepared for a very active life. **According to these very rapid changes, a constant and good preparation may be the key to a motivated student (employee) activity.**

The project ***FAVIR*** will form an active virtual team working on the Internet and will have on-line courses in the following fields: Computer Aided Manufacturing (France-INSA

Lyon), Business on Internet (Greece), Operational Management (Italy), and Optimization strategy for simulation manufacturing (Romania).

The project w~~-~~, originally planned to be of two years duration (beginning with 1999). We had proposed this year an extension at three years because we think that is the optimal period to finish in the best's conditions what we are proposed at the beginning and to achieve autonomy for the continuation of our ODL project in ours universities. We hope to give to our students the possibility to finish those courses with a degree recognised from our Education Ministry.

For this second year we will seek to multiply the effects expected from this project and to bring new partners into our team by demonstrating the feasibility and the interest created by our project. The new partner involved this year **Liverpool Hope University College** have great experience in the ODL domain, they include the professional training of teachers and many other academic subjects. These include large, successful Professional Studies, Business and Management and Information Management and Communications departments. In this way, by including a contrasting partner we seek to optimize the effectiveness of the project and to maximize the dissemination multipliers created.

We seek to develop a conceptual framework for a really collaborative ODL based on communication enriched by knowledge sharing to reuse previous problem solutions and capture new solutions.

The main target groups are on-campus and distance education students; they include Ph.D. students wishing to complement the traditional engineering courses and to upgrade their professional knowledge's with the main to access to a new, modern qualification in the future active life.

The enterprises are also interested in this form of learning for their personnel with the aim to renew the qualification of their engineers. It thus has a significant knock-on effect in professional training and development.

In the first year we are in the process of developing a web page, CD and booklet with the contents of the four courses, the description of ours universities and the level at where each partner is situated in an ODL structure.

For the second year we propose to prepare, to change, test and translate in English the classic courses into ODL courses. We also expect to carry out an evaluation of the effectiveness of the materials created and the outcomes of the students this will provide a suitable testing programs, with course revision, and publishing the project results on the Web page.

For the third year we propose to implement those courses at the beginning in one university to Ph.D. students, and to monitor and disseminate this findings of this pilot ODL activity. At the end of the third year we try to obtain formal recognition of this Open and Distance form of learning from the relevant national Education Ministries.

So, after the end of this Socrates ODL project we can continues the activity and to transform it into a continuos ODL activity and not only to close the page of a new experiment.

2. The situation existing in Romania at this moment in ODL domain

This Socrates ODL partnership project is the first one to be supported from Romania and we are thus discovering the value of technology-based open and distance learning within the lifelong learning process of employees including our ex-students as job seekers.

There were many common problems that appeared in these domains:

- To produce a common product by the end of the first year was difficult, as the technology has not had the same impact in each country? For example, in Romania distance learning materials are more accessible by CD in comparison to had access to the Internet. This is not the case in all partner institutions.
- Are professors prepared to put the courses in an accessible form for networked learning? Are they prepared for the boom of network learning?

- Are the students prepared to learn without being closely monitored by their teachers?
- Had we the power to demonstrate that our methods are the bests in the networked learning at the beginning of the second millennium?

At the beginning of the first year we spent two months posing these questions between the project partners and after e-mails discussion we realized which would be the possible alternatives suitable for each partner.

So, we propose to make a sample of CDs at the beginning and offer to produce more at the request of the interest persons. The CD will store the most important course and project information from our Web page in French and English.

At the same time we will work to develop a booklet with the most important information found on our Web page in French and English and with the presentation of our CD to incite the possible benefits to ask the printing of the CD.

In Romania at this moment the professors haven't an easy access to the Internet just in time. Unfortunately we concluded that we are not the only countries in this situation. So the CD can be consulted by anyone and it will incite to access Web page.

For the most disadvantageous people concerning the possibility to join Internet (ex: different education organization, foundations, career centers etc) the booklets are more suitable and accessible. So we can assure access and the dissemination of ours project information to all the levels.

At the beginning we establish the possibilities and the needs of each partner relating with this project. We saw that due to new technologies, knowledge delivery modules have also changed to include on-line (education access through the Internet) and distance education (interactive learning).

So, many institutions of higher learning have adopted ODL as the next logical step in educational delivery systems like the educational pedagogy of the future:

1. To convert the classic courses into online formats and to translate in English;
2. To support and manage distance education,
3. At the end of this project to continuos this activity.

In communication we utilised asynchronous facilities like e-mail, file transfer and newsgroups and synchronous communication facilities like chat. These facilities will be allow communication between partners, tutors or instructors and students or between students (peer group discussion), but they also allow information sharing and workgroups. At this moment we have a virtual meeting room in an e-mail group address were we share ours project problems.

Student's tools: the most common tool student can access are the resources building the "online courses". Virtual Reality presentations or simulations are not very easy to use today. So we will have also a CD with the presentation of ours courses and also we will give the students the possibility to access the material put to a server with limited utilization (that means only for students and of tutors, professors).

Support tools: this category regroups tools for the instructors or the tutors. Besides course planning and design, the commonly provided facilities include course customization, course monitoring and managing, which allows the instructors to collect various information from the students (use of the resources), data management (marking, statistical analysis), and sharing facilities among the instructors or tutors community allowing them to build collective knowledge.

At our university in Romania, we have a ODL tool represented by: two stations SUN ULTRA 10, a video camera, a digital camera, and a Computer Integrated Manufacturing – Festo utilized for simulation and manufacturing (figure 2). At this moment by a program financed by Mondial Bank we had the possibility to share soft and courses with two faculties from our university. With INTRANET the students of three faculties can assist in the same time (on-line) to an experiment (video-experiment) made in one of those faculties. We hope to extend this experiment with others universities in our country.

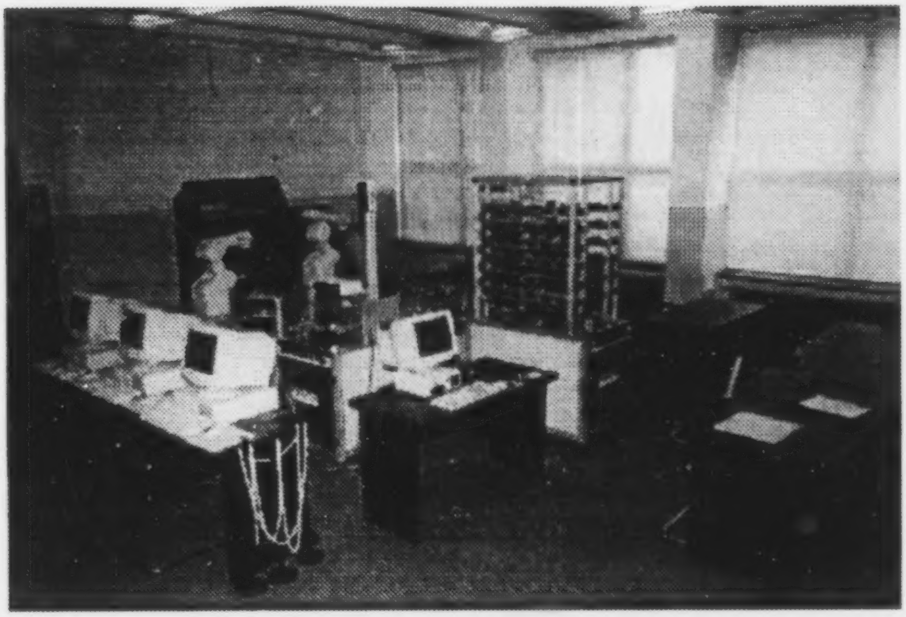


Figure 2. CIM-Festo from University POLITEHNICA of Bucharest

At the end of October we participated in a networked learning forum, **"Web-based learning environment in Europe – pedagogical challenges"**. This was a great experience for us. The virtual discussion platform (160 people from different countries in Europe have registered for the seminar) gave us the answers to many questions about web-based learning. We discussed what we couldn't do with these systems, what are their functions, how we can use them to teach, but also to train, to study and to learn, according the side of the teaching/learning process we stand on.

We have developed our project web page: http: // leo. optimum. pub. ro /socrates /favir. html where we have placed the synopsis of the project. At this moment we have prepared a lot of materials, such as the contents of the courses, the description of the partner institutions ready to be put in the web page (bilingual - French, English). We are awaiting the last modification of our partners (made to our e-mail group address, a virtual meeting room) to be able to put this onto the web page. We send all the documents that we intend to put into web page (contents of the courses, descriptions of the universities, description of our activity) we discuss them and after the modification or not we putted them into the web page.

We established the specific needs of each partner, the courses and to a common modality to transmit the contents of the courses into a web-database. We established some core points including:

- Evaluation the potential abilities of each partner
- Integrating of each in a potential model of "excellence"
- Becoming and staying responsible for themselves (to have the motivation to complete open and distance courses)
- Construction of the goals and objectives
- Selection of a strategy to reach the target audience

We think that we are already working in a 'real' virtual team; we share so many common points of view and we share also very many different points of view. But the real problem is how and when to accept the others opinion and to recognize that is the best. We think, that the first few months of activity were very important in terms of strengthening the partnership and the relationship between collaborating institutions and to discover the human and technical potential of each partner.

Monitoring and evaluation:

For the monitoring and evaluation of this project for the first year we have used an expert who has consulted with us about this domain. We also produced a report after some test questionnaires from students with the aim to see the impact of those courses in that form of presentation (for ODL).

Dissemination of the project:

We will disseminate our project at the meetings with the university staff from Romania, with ours partners from another countries, etc.

Also we have been accepted with a paper where we disseminate our ODL project **at the international workshop HRTC 2000 – Human resources Training Center entitled: *"ODL Implementation – Romanian Universities problems"***

We will participate at the professional training **program CEFES 2000 (Workshops and online Seminars for university staff members),** like academics involved in Distance Education and Open learning systems. We will participate also with 5 Ph.D.students.

We have connected an ERASMUS Socrates project with FAVIR. This will provide the possibility to our staff and our students to work together at the partner University. For example we have agreed 3 staff mobilities and two for the Ph.D. students in France.

3. Conclusions

The benefits of networked computers are accepted as the new educational technology starting point. The FAVIR Project thus emphasizes the opportunities offered by the network-oriented society for diverse interaction. As a result virtual learning communities may emerge. Teamwork skills are a prerequisite for success in these situations. Cooperation and collaboration are possible as functional working modes within the team. In cooperative groups, it is deemed equally important to give and to receive help. Learners understand that they can only reach their goal if the group, the community, reaches its goal (Johnson & Johnson 1996). So, the ability to learn to communicate in different communities and to learn to use new tools is essential for operating in modern society. Thus it is presumed that learners should be taught teamwork and interactive skills. Dialogue is a tool of this learning where action and learning are linked with the concept of shared expertise.

So constructivist models encourage learners to develop the strategies and expectations that underpin their ability to successfully work collaboratively (Benzie, 1997). So there is a need to consider the role of technology in the learning process, and how communication is affected by modern information and communication technologies.

Specifying precisely the relationship between shaping and effects is currently a goal of research' (Edge, 1995). The FAVIR project will thus seek to evaluate the relationship between technology and outcomes, whether technological is deterministic of improved learning outcomes. The concept that technology also gives rise to social change, and that society shapes technology is also at the core of the FAVIR Project discussing whether the fact that using technology significantly changes teaching processes. The outcomes can then be used to develop facilities that will support learning techniques and attitudes with an eye to the future.

The notion of dialogue as the basis of communication and interaction. Dialogue is a crucial element in the creation of any learning system and especially in establishing a collaborative networked learning environment.

So, the key principles of co-operative learning are positive mutual dependence between learners, interactive communication, individual responsibility, an emphasis on social skills, evaluation of one's own learning, and target-oriented working (Vähäpassi 1998).

4. Bibliography

1. Socrates ODL partnership project **71206-CP-1-1999-1-RO-ODL-ODL.**
2. "Web-based learning environment in Europe – pedagogical challenges (13027 November 1999.
3. Clark, T. (1993). Attitudes of higher education faculty toward distance education: A national survey. The American Journal of Distance Education, 7 (2), 19-33.

“Deep” learning and computer mediated communication: a case study of on-line teacher education”

by Gary Motteram and Joanna Teague
University of Manchester

Introduction

In the Centre for English Language Studies at The University of Manchester we run a Master's degree in Educational Technology and English Language Teaching (ELT) which is offered both in distance plus residential (a summer school), or fully distance modes. As part of the programme participants take one module that is run fully on-line. Other modules make use of more traditional distance learning technologies, with on-line support via email.

The module in question is called 'Computers and Video as a Resource' (CVR) and is usually taken as the last of six taught components. The reasons for delivering this module on-line are:

- Course participants experience different kinds of computer mediated communication (CmC) as an integral part of their distance learning rather than just reading about them.
- Participants can then reflect on their use of CmC and consider how they might be used in their own professional context. We look at issues such as teacher education, testing, research and management.

Transformative education

There is a current trend within education that looks at what added value a course can provide particularly with respect to transferable skills. This has always been an important aspect of the course's philosophy. However, in addition to the skills side of the course we feel that there is something more fundamental. In this paper we argue that the Master's course we offer is "transformative". Our interpretation of transformation matches with that described by Corder et al (1999:103):

> *Employers are seeking graduates with the capacity to be adaptive, adaptable and transformative. To be adaptive graduates must be able to fit into the workplace, work in teams, exhibit good interpersonal skills, communicate well, take responsibilities for an area of work, and perform efficiently and effectively. Adaptable graduates use their own initiative to develop new ideas, and persuade others to accept and develop their own ideas. Additionally the transformative graduate will innovate, inspire others, anticipate and lead changes.*

Our course participants are postgraduates and are mostly in full-time employment when they take CVR. They work for employers such as universities, private language schools or as freelancers. CVR is assessed via an assignment, which consists both of a rationale and a more practical application of the ideas. Assignments are related to a participant's own professional context or one in which they would like to move into. We have extended our course into the virtual world as we are aware that this is increasingly where our participants will be expected to perform and we give them the opportunity to both learn about and evaluate their experiences in this area. This is one aspect of transformation.

However, as Mezirow (1990:8) states, "Not all learning involves learning to do". Participants on CVR undertake a number of tasks which can be collaborative, or individual, and they are required to report and reflect on these experiences via a dedicated email discussion list and in email journal entries. Critical reflection is a fundamental aspect of transformative learning. Mezirow (1990:xii) defines transformative learning as:

> *The process of learning through critical self reflection, which results in the reformulation of a meaning perspective to allow a more inclusive, discriminating, and integrative understanding of one's experience. Learning includes acting on these insights.*

Wetzel et al (2000:16), paraphrasing Cranton, illustrate what is meant by "acting on these insights":

> *... critical reflection can lead to transformations in teaching practice, what Cranton (1996) calls transformative learning. Transformative learning occurs when there is revision of basic assumptions, beliefs, or perspectives. Thus, for example, when a teacher revises her teaching perspective to incorporate a problem solving orientation rather than merely teaching an array of isolated algorithms in mathematics, she demonstrates transformative learning.*

"Deep" learning

With the emphasis being on reflection, we wanted to look further at the kind of transformation that had occurred and evidence of what Toohey (1999:9) calls a "deep approach" to engagement with the material.

We argue that "deep" learning means going beyond the basic input from the module and looking beyond the discussion that occurs on the email list. The participants are encouraged to read widely around the module themes and to make links between the ideas that are presented, their own ideas and ideas that are expressed within the literature. In order to receive a high grade on an assignment participants are expect to show a high level of critical analysis and awareness, to have a broad knowledge of relevant literature and to present their ideas in a cohesive and coherent way.

The role of CmC

Although we were looking for evidence through journals and the final assignments, we were also interested in the way that CmC can have an impact on the development of deep thinking about ideas. This idea of a deeper understanding of issues coming from work in an asynchronous environment comes from studies and reports by writers such as Harasim et al (1985) and Mason & Kaye (1989) amongst others. They suggest that if participants are engaged in writing, rather than talking, they are able to attain a higher level of analysis of ideas. There are a number of reasons why this might be the case:

- ☐ students have more time to think about the responses;
- ☐ they are able to engage with developing arguments;
- ☐ they have time to follow up references and read literature, so that responses can be more detailed and argumentative;

- ☐ more of the group are able to participate in interactions;
- ☐ contributions can be seen as being more objective and anonymous;
- ☐ there is a group record of the debate that can be used as an accurate reference at a later date (such as the assignment stage).

In earlier work by Motteram (under consideration) and Teague (1999) we explore the nature of the relationship between synchronous and asynchronous communication and argue that there is research evidence to show that both synchronous and asynchronous communication have distinct roles to play in on-line distance education. This paper takes these ideas further.

The students

This summary paper focuses on the experiences of one participant who was part of an initial cohort of 16 registered on CVR. In the full conference paper we present two case studies from this cohort. These were selected because they began this module with differing skills and experience in terms of using new technologies and in terms of distance education.

The first participant, K, defined herself as an "internaut novice" at the start of the module as she had only used email for a year and had no prior experience of email discussion lists. However, she was familiar with synchronous communication in distance education as she had teleconferencing as a distance tutor. She had also completed two modules at CELSE in distance mode. The case study featuring K will be presented in the full conference paper.

The second case study featured S, who was also new to all but email in terms of the CmC tools used to deliver this module. CVR was his first experiences of distance education as he had completed his previous modules as a local part-time student. Because S lived locally to the university he was also in touch with the tutors by phone and in person and had a number of meetings during the year to discuss the module and the assignment. S is featured in this summary paper.

Transformative education

As we considered the data certain patterns emerged which could be related to the literature on transformative education. In order to highlight these patterns we have divided the main features of transformative education into a series of five inter-linked parts in the following table:

A transformative education scale

1. Getting an overview	1. Read input materials (new ideas), become acquainted with new ideas and new skills. Reflect on these in terms of own experiences.
2. Supported knowledge and skills development	2. Try out new skills with support from tutors. Discuss ideas with peers and tutors on-line. reflect on new experiences & progress with further reading.
3. Gaining independence	3. Try out new ideas in own professional context. Discuss these ideas with work colleagues.

4. Going it alone	4. Establish a personal view and become confident with new skills.
5. Transferring knowledge and skills to others	5. Innovate & inspire others to change ideas

The key research questions in our minds were therefore twofold:

- Did transformative education take place as part of the module?
- Was "deep learning" taking place?

The following case study uses the five level scale of transformative education with extracts from the research data to support our affirmative answers to these research questions. In the full conference paper we also include the second case study.

Case study 1: S

During the module S demonstrated that he was developing new skills and reading the input materials. He was beginning on the transformative education scale and his reading at this level fed into his assignment. After each synchronous meeting students were asked for their reflections on the meeting. In this particular instance the synchronous CmC telecommunications tool was a Multi-user Object Orientated environment (MOO) called SchMOOze. In this environment participants communicated via the WWW by writing text messages. In reply to the tutor's message entitled 'How was it for you?', S gave the following reply:

> Dear Joanna
>
> In short it was frustrating!!!!!!
> I think 2 things were happening.
> 1) For some reason still unknown to me I got into the MOO only to be thrown out seconds later. It was embarrassing to see "S is trying to enter the room" so many times.
> 2) This was my fault as once I got in I forgot how to encode the messages. I tried these( ) and < > and { } and [ ] and finally " ". By the time I rediscovered the correct method everyone bar Gary, C and yourself had left.
>
> Lessons learnt:
> - make a note of how to enter SchMOOze
> - Make a note of how to send messages
>
> Bye S

However, this frustration did not deter S from using SchMOOze again. Instead, he soon mastered the skills for MOOing and later used his experiences of learning to use CmC software as a starting point for co-operative work with the other course participants on the module. As part of the module units, course participants were asked to design a questionnaire for others on CVR. S's reflections on his own frustrating experiences of learning to use CmC software were apparent in his questionnaire as he asked participants to describe what they liked and disliked about the different CmC environments:

> 'On MD 636 we have used three different environments for real time meetings. This questionnaire will try to evaluate your responses to using these.
>
> ...4) The third meeting area we used was the CELSE room at SchMOOze University. What was your impression of the CELSE room at SchMOOze University? (http://schmooze.hunter.cuny.edu.8888/) What did you like/dislike about it?
> 5) Some of us had difficulty (technical and other) 'getting into' the on-line meeting rooms. Can you recall which rooms you had the most difficulty gaining access to and why?
> 6) How did you feel when you could not gain access?
> 7) Once you were in the meeting room and you could see one of your virtual peers struggling to get in. Did you feel for them? What feelings/emotions did you have?

The results from this questionnaire provided S with answers he could use to compare with his own and this clearly contributed to his thoughts on the potential of CmC in his professional context. His assignment described how he was later to compare the different packages in order to select one for working with his work colleagues.

S developed his skills and interest in using synchronous CmC during the module and when he reached the module assignment stage he was interested in looking into the possibilities of MOOing in greater depth. It is at this stage we can see that the reading, reflection and on-line communication with the other students on the module facilitated his progress as he moved from the early levels of the transformative education scale to the third level.

S assessed different synchronous CmC packages and introduced SchMOOze to his colleagues. He designed and managed a small research project with his colleagues in order to investigate how synchronous CmC could be used effectively for place-flexible staff meetings. This move into using different ways of working with his colleagues can be seen as both innovative and inspirational. He stated on the email discussion list:

> '...I am also using email as a means of communicating with colleagues in other colleges and I have cascaded information to other members of the ESOL team.'

This project formed the empirical element to his module assignment. In the conclusions to this assignment he described not only how the findings from his research indicated how CmC might be best used in his professional context, but he also indicated how this project was likely to grow in the future:

> The main benefits of continuing the on-line meetings [with my colleagues] at the present time are related to training and confidence building. There are two possible future benefits. [...] The second and more important benefit identified in the [post MOO] interviews is to use these meetings as a springboard to conduct on-line meetings with other Trinity College Centres. On-line meetings then, would be more useful in formal rather then informal meetings. These will also help us to share good practice as well as save travel time and money.

We can see S working at two parallel levels. He has gone beyond learning about effective CmC to transferring his newly learned skills to others. The confidence building may relate both to his colleagues and to himself.

In the post-module interview S described how this project had led to a number of projects where he now had a 'finger in many pies'. He felt he was beginning to create a professional niche for himself as more and more colleagues identified him as the person to ask when it came to CmC projects. This, he felt, would not have happened if he had not taken this module. The exciting list of further developments included the following:

- ☐ Firstly, his assignment project captured the imagination of his work colleagues and was to be presented at the next international meeting of Trinity Colleges in order to explore larger scale development.
- ☐ Secondly, the language learners' email project, which S had described earlier in the module, had developed into a project with funding from the Further Education Development Agency (FEDA).
- ☐ Thirdly, it seemed that this could be developed into an international project in the future. S was still in email contact with one of the module participants who was based in Portugal and they were both interested in starting an international e-pal link between their language learners.

The development in S's professional context were exciting and encouraging. Within a month of completing the module there was already evidence that S had progressed through the scale of transformative education and was happy about having done so. In the post-module interview he stated:

> '..Its great, it's really taken off, [...] Its because I've learned so much in such a short time its like a really steep learning curve. Its like when we get [English language] 'beginners' come, you know, we get a lot of asylum seekers at the moment. No English, you know, and within weeks they're having basic conversations and I think its the same with me, I've just learned such a lot and it works! Its working! And I'm enjoying it, really enjoying it!'

Conclusions

This research demonstrates that course participants are engaging with the material and ideas presented in this module in a deep and meaningful way. It demonstrates the validity of on-line education for practitioners such as those in ELT who are able to learn new skills an ideas, relate them to their own context and then reflect on these experiences in terms of the literature and their deeper thinking. They have clearly gained new knowledge from their experience in the on-line environment and have gone far beyond the basic facts to a level where they are beginning to make use of both knowledge and skills within their own professional context. We suggest that this does not always happen in the full-time face-to-face environment as ELT participants are less likely to have the time and access to their professional context to progress through the five levels of the transformative education scale as they progress through their module. We can show that it is clearly possible to run an on-line module that takes the participants well beyond a basic knowledge and skills level and transforms them in a positive and effective way. We feel that in the context of this module we can say that we witnessed on-line transformative education.

References

Harasim, L., Hiltz, S., Teles. And Turoff, M. (1995). *Learning Networks*. Cambridge Mass: MIT Press.

Corder, M., Horsburgh, M. & M. Melrose. (1999). "Quality monitoring, innovation and transformative learning." *Journal of Further and Higher Education*, 23/1 pp 101-108

Mason, R. and Kaye, A. (Eds). (1989). *Mindeweave: Communication, Computers and Distance Education*. Oxford: Pergamon.

Mezirow, J. et al. (1990). *Fostering Critical Reflection in Adulthood*. San Francisco: Jossey-Bass.

Motteram, G. (under consideration). " The role of synchronous communication in fully distance education" *Journal of Research on Computing in Education.*

Teague, J. (1999) "Computer mediated communication in distance post-graduate teacher education: students' and tutors' perceptions of different types of computer mediated communication." Paper presented at British Educational Research Association Conference [accessed 8 March 2000] http://gps.leeds.ac.uk/cgi-bin/ucs/brs_engine_v1

Toohey, S. (1999). *Designing Course for Higher Education*. Buckingham: The Society for Research into Higher Education and the Open University.

Wetzel, K. A., Zambo, R., and Buss, R.R. (2000). "Personal development for transformative teaching with technology in K-8 classrooms." *Journal of Computing in Teacher Education*, Winter.

'Empowering Online ESL Learners' Reflections on the experience of developing an existing undergraduate course from a classroom-based to a predominantly network-based environment

Nick Noakes
Language Centre
Hong Kong University of Science and Technology

> " ... distance education requires more than a software package that allows an institution to offer coursework online. In any setting, whether academic, organizational or corporate, it is critical to remember that *people* are using the machinery that makes the course go. The human element, therefore, will inevitably play a role in the electronic classroom" (Paloff & Pratt, 1999)

Introduction

This project focused on the design and delivery of an existing elective course in Advanced Reading and Writing in English for ESL learners for final-year BBA undergraduates at the Hong Kong University of Science and Technology (HKUST). I am the curriculum designer, materials writer and the course coordinator for this course (LANG 304 - see **http://lc.ust.hk/~courses/304/** for the course description and objectives).

Context

I work in quite a strong didactic educational environment; not just within my institution but within Hong Kong and Asia as a whole. A context that is probably typical of most tertiary institutions around the world in terms of teaching philosophy in that it follows what is basically a transmission model approach to teaching and learning (Pratt, 1998). This approach is also taken in schools from a very early age and in Chinese culture it has a strong tradition and history.

As a result, students have quite strong and fixed ideas about 'effective' learning and teaching; one where the teacher is seen as a 'master' (to use the literal translation from Chinese). Students very much expect to be told what to do and do not expect to have to make decisions about their own learning. This teaching-learning context is difficult for me personally as it conflicts with a lot of my own beliefs about learning and teaching, creating tension when as I try to help these Hong Kong students move towards being both self-directed and interdependent (i.e. peer supported and supporting) learners.

The Project

In this action research project, I wanted to investigate a number of issues associated with the process and outcomes of transferring a face-to-face course to an online environment. Specifically, I wanted to:

- Find out the extent to which my espoused beliefs match my beliefs-in-action
- Find out about the extent to which students expectations can be moved towards assuming more learner responsibility and self-managed/self-directed learning

- Experiment with implementing portfolio-based assessment which I believe is more congruent with my own beliefs about learning and teaching
- Find out what one group of learners perceive as the benefits and drawbacks to learning in this way
- Become aware of some of the key processes involved in transferring a classroom-based course to an online environment and some of the major pitfalls to avoid in doing this

In doing this, I needed to:

- Identify some of my own beliefs about learning and teaching and their relationship to theory
- Design the course so that it matched my beliefs as far as possible given the constraints of the contexts within which I work
- Implement the course and observe the changes I made in response to the learners and circumstances as they unfolded.

Personal Learning Theories behind the course
Both the face-to-face and online courses were based on social constructivist learning principals (Lave, 1991; Laurillard, 1993; Crooks, 1994). In the online course, I particularly wanted to enhance these principals which are based on three main strands:

- *Cognitive approaches* (particularly Kelly's (1955) personal construct theory) which emphasise the importance of what the learner brings to any learning situation as an active meaning maker and problem solver. Thus the learner takes centre stage.
- *Humanistic approaches* (particularly Rogers, 1982; Kolb, 1984; and Schön, 1983) which emphasise the development of the whole person in learning/educational settings.
- *Social interactionist approaches* (Vygotsky, 1962, 1978 and Feuerstein, et al., 1991) which emphasise the dynamic nature of the interplay between teachers, learners and learning tasks and provides a view of learning as arising from interactions with others. From this, I believe that learning never takes place in isolation and recognise the importance of the learning environment or context within which learning takes place.

Course Design, Delivery and Evaluation

Design of a four-week intensive online course

In order to empower the students and foster self-directed learning, as well as increase interest and motivation, I had students take more responsibility for their own learning by designing a course which asked students to make decisions about:

- The course content
- The types of learning tasks/events they engaged in
- What was assessed
- How it was assessed
- The criteria used in the assessments
- Who would do the assessing

In order to foster reflective learning, and to facilitate students' awareness of their own learning styles and preferences, I incorporated learning journals and portfolio-based assessment.

In order to facilitate community building, to foster peer learning and to cater for different learning styles, I included cooperative and collaborative tasks, along with individual tasks. By cooperative tasks, I mean ones that were done individually but which had feedback from peers right the way through. By collaborative tasks, I mean ones which were done as a group with a shared and agreed group goal. For these collaborative task, thew students self-selected their groupings dependent on mutually shared interests and goals.

In order to enrich their learning in a way that is not generally practical with face-to-face classes, the students were grouped within the computer conference so that intra- and inter-class communication was possible. The latter of these would only happen informally (if at all) in a face-to-face learning environment.

In order to make them more aware of the resources, students used online library databases supplied by the educational institution as well as business and current affairs magazines available for free on the Internet.

And finally, to meet the course objectives, I included learning to learn skills, critical reading skills, seminar skills and business writing skills.

After devising this plan, I felt a lot of trepidation, as I 'knew' from past experience that giving Asian students this amount of choice is usually interpreted negatively as meaning that the teacher hasn't a clue as to what she/he is doing. With all my face-to-face courses, I ask students to make collective decisions in terms of course content and processes. However, I generally do not do this until about half way through, when I feel they have 'gelled' as a group, have trust in each other and have trust in me in providing them with a conducive learning environment; a place where they feel valued, respected and supported, a place where they can safely take the learning risks that come with successful foreign/second language learning (perhaps any type of learning).

Delivery

A total of sixteen students enrolled on the course. A number of conference areas were set up for the students so that different types of interactions could take place:

- All students
- Two groups of eight students who met in the face-to-face seminars for posting seminar articles and discussing anything relevant to the face-to-face class as a
- Four groups of four students for the main learning work of the course; critical reading (and associated vocabulary), seminar and business writing skills. The smaller groups of four people were set up so that reading and responding to peers' work did not become overwhelming while at the same time maintaining a reasonable level of interaction. I believe that this balance between the level of interaction versus information/work overload is a key issue for asynchronous networked collaborative learning.
- Individual student areas for learning journals and any private discussions with the facilitator

Evaluation (by participants)

The comments highlighted above were also born out in the students' summative evaluation of the course. They were asked to complete an online summative questionnaire of mostly open-ended questions covering seven main areas and this had a 75% response rate (i.e. 12 out of 16 students).

Students' perceptions of the affordances and barriers to their learning

It would seem that students generally felt that a key component of the course was the opportunity to learn from peers and the role the computer conference played in facilitating this. They also believed that the course materials and the instructor aided their learning.

However, they felt that campus connection facilities, particularly HKUST's limited number of modem lines and the time restrictions computer services place on a continuous connection hindered their learning the most. Other key factors that hindered their learning included outside commitments, self-management, computer literacy, ESL literacy and the intensive workload within the time frame.

Students' perceptions of areas to retain and improve

25% of the students suggested that everything should be retained. Most students commented that the self-directed nature of the course, the mix of online and face-to-face delivery, peer commenting/feedback and the writing and seminar skills also should be retained. One student also stressed retaining student choice over seminar topic and responsibility for seminar preparation in order to ensure "student effort".

In terms of changes, there were no major agreements. Individual comments included improving the navigation of the computer conferencing system, giving online course participants a 'priority' connection to the campus, submitting the portfolio as a word-processed document and not a hypertext one, and either reducing the workload or giving longer deadlines for the writing tasks.

Affective reactions both before and during the course

Prior to the course, most students felt a mixture of excitement and worry for the same reason; namely that they had never experienced an online course before.

After the course got going, students' positive feelings intensified a little with most students feeling excited and eager as they realised that everyone was as committed to the course as they were, and the course met their needs and wants. Although they were concerned about the demands of the course from it's intensive delivery, they saw this as a positive challenge. However, negative feelings associated with their ability to technically cope in terms of computer literacy still persisted.

Students who started out with positive feelings at the beginning of the course felt these did not change. Students who initially had negative feelings felt that these either decreased or were eliminated as they went through the course. The reasons for this included:

- the course being very "active", "interesting", "funny" and "not boring";
- the small class size;
- the relevance of the content to their needs and wants;
- the encouragement and support from the facilitator;
- enjoyment in learning through this medium, and
- their ability to "take the initiative to learn and participate".

Student's perceptions of their degree of control over the course

Students' perceptions ranged from a reasonable amount of control to a high degree of control over course content, task type and assessments. Comments that demonstrate this understanding and show students perceptions of a high degree of student control include:

> "In the writing tasks we can choose what we want to learn and what the topics are for the seminars"
>
> "The course content is quite flexible"

Students' perceptions of the reflective learning tasks (learning journals and learning portfolios)

For the learning journals, students' reactions generally were positive; feeling that the journal pushed them to think about what they had learnt and they valued the opportunity to reflect. As one student says:

> "It's useful to keep recording what we have learnt so that we can evaluate our learning at the end of the course."

However, two students did mention that they found it difficult to write the learning diary. This was either because they weren't sure of what they had learnt at the end of a particular day, or because they felt that the high workload of the course did not give them enough time to reflect.

With the portfolio-based assessment, most students felt that it aided the reflection, retention and consolidation of their learning. But one or two felt that it was very time consuming or that they needed clearer guidelines for the portfolio construction.

The students' web-based learning portfolios can be viewed online at http://lc.ust.hk/~courses/304/portfolios/

Students' reactions to the delivery timing and pattern

All students felt that running the course in the summer when they had less commitments was a good idea. It was generally felt that the course would be better offered as a 6-week intensive rather than a 4-week one, while retaining the same workload. However, one student's comment has stuck with me as it has really made me question my 'flexibility' with students in my normal face-to-face teaching as well:

> "I remember that some of our classmates think the schedule is tough before. I don't think so. Because we should expect this before we take this course. This is a 3-credit course and condensed to a very short period. And therefore should have very tight schedule. I think may be you should not be so lenient in delaying the deadlines of our homework."

Students' assessments of their time commitment

This ranged quite widely from 10 hours per week to 40 hours per week; although most were around 20 hours a week in total with about 60% of this time being allocated to reading and writing in the computer conference.

A 'catch all' to ensure that everything the students had wanted to say had been covered

There were only a few responses received for this and of these most were complimentary. However, one student made a number of suggestions concerned with getting more feedback from me which was a little disheartening given one of my main objectives was to increase students' self-directedness.

Lessons Learned

At the start of this paper I gave a number of issues that I wanted to look into in undertaking this project.

To find out the extent to which my espoused beliefs match my beliefs-in-action

- *Increase opportunities for student choice*

I feel I ran the course with a high degree of teacher control. Whereas previously I had believed that I allowed a lot of student choice and freedom for the learning-teaching context I work within, I now am not sure and question this personal assumption and will need to investigate it through a small-scale action research project. I need to look into a number of areas here:

- To what extent am I really affording self-managed learning for my students?
- What is my place as a teacher in providing 'task's for learners?
- What is my role in a partly or largely self-managed programme in this respect?
- What does it mean to provide tasks in my (or any) learning context?
- Who decides on what a task might be, and why?
- Is it possible that when I decide on tasks, learners then have to spend time trying to understand what I was trying to get them to do by carrying out the task; they'll work towards my agenda, rather than perhaps their own?
- Is it that when I suggest a task, the students inevitably want to know why the task has been chosen, and inevitably they want to re-define it in ways that make meaning for them in their situation?
- Is there any benefit of ever suggesting a 'task'?
- Is there more a need to provide a context where learners can define their own tasks, so that they "own" them and have brought personal meaning to them?

The questions we raise about how each of us defines 'task' in a different way, their meaning and who decides and why, is a constant tension for all teacher-facilitators. A tension between what we'd like to do and how we have to work within the constraints of our varying, layered contexts (institutional, departmental, colleagues and learners).

To find out about the extent to which students expectations can be moved towards learner responsibility and self-managed/self-directed learning

- *Students can be moved quite far along the path to self-directedness in their learning when their context does not militate against this.*

I generally think that this group of learners moved considerably towards learner independence and interdependence. But, as they say, a key factor in facilitating this transition was doing this course without the pressures and demands of simultaneously studying other subjects that continually send signals opposing self-directed, empowered learning.

To experiment with implementing portfolio-based assessment which I believe is more congruent with my own beliefs about learning and teaching

- *Continue to use portfolio-based assessment*

This is one part of the course that I felt was a real success and I have now made the production of a learning portfolio (along with learning journals) the assessment method for this course but have allowed the submission of a paper version for those who prefer this.

To find out what one group of learners perceive as the benefits and drawbacks to learning in this way

To summarise these briefly:

- *Benefits*
    - ⇒ learning from peers facilitated by the computer conferencing system
    - ⇒ the course materials
    - ⇒ the instructor

- *Drawbacks (hindrances)*
    - ⇒ campus connection facilities
    - ⇒ competing demands (other courses, summer vacation work, etc.)
    - ⇒ their lack of self-management
    - ⇒ their computer literacy
    - ⇒ their ESL literacy
    - ⇒ the intensive workload within the time frame

To become aware of some of the key processes involved in transferring a classroom-based course to an online environment and some of the major pitfalls to avoid in doing this

- *Planning*

One thing I feel I have learnt is that taking a course online requires a lot more planning in terms of structure than I ever had anticipated. This is not the same as having lots of tasks for the students to do but is about constructing an open and flexible structure for students to work within.

Conclusion

To sum up, I believe that following an action research cycle when moving to online learning and facilitating not only engenders learner empowerment, but also engenders teacher empowerment! I think it engenders teacher empowerment because as a teacher I feel greater ownership of the course as a result of the 'issue' identification, reflection, implementation, and evaluation spiral process. At the same time, I think it engenders learner empowerment because you tend to incorporate the same action learning process into the course design for your students' learning with tasks that ask them to make choices, implement them and then reflect on, and learn from, the perceived outcomes of those choices.

Bibliography

Crooks, C. (1994) Computers and the Collaborative Experience of Learning London, Routledge

Feuerstein, R., Klein, P. S. and Tannenbaum, A. J. (1991) Mediated Learning Experience: theoretical, psychological and learning implications. London, Freund

Kelly, G. (1955) The Psychology of Personal Constructs New York, Norton

Kolb, D. A. (1984) Experiential learning : experience as the source of learning and development. Englewood Cliffs, N.J. : Prentice-Hall

Laurillard, D. (1993) Rethinking University Teaching: a Framework for Effective Use of Educational Technology London, Routledge

Lave, J. (1991) "Situating Learning in Communities of Practice" - Chapter 4 in Perspectives on Socially Shared Cognition, eds Resnick, L.B., Levine, J.M., and Teasley, S.D.

McNiff, J., Lomax, P. and Whitehead, J. (1996) You and Your Action Research Project London, Routledge

Paloff, R. M. and Pratt, K. (1999) Building Learning Communities in Cyberspace: Effective strategies for the online classroom. San Francisco, Jossey-Bass Publishers

Pratt, D. (1998) Five Perspectives on Teaching in Adult and Higher Education Krieger Publishing Company

Rogers, C. R. (1982) Freedom to Learn for the 80s Columbus Ohio, Charles Merrill

Schon, D. A. (1983) The Reflective Practitioner: how professionals think in action New York, Basic Books

Vygotsky, L. S. (1962) Thought and Language Cambridge, Mass. MIT Press

Vygotsky, L. S. (1978) Mind in Society Cambridge, Mass. MIT Press

WOLF (WOLVERHAMPTON ONLINE LEARNING FRAMEWORK)

John O'Donoghue (Primary Author)
Liz Fleetham
Colin Dalziel
Steve Molyneux
Delta Institute.
University of Wolverhampton.
j.odonoghue@wlv.ac.uk

A specification for the setting up of a learning environment.

The rationale for the creation of an online learning infrastructure is clearly multi-faceted. Infrastructure suggests connections, detail and possibly a fixed topology, but is this reasonable within the context of teaching and learning?

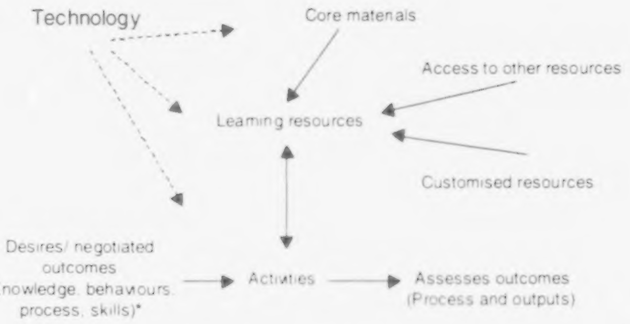
The infrastructure within Wolverhampton is complex. It has a large estate with multi campus cultures and traditions. The delivery mechanisms are based on a modular approach, often with multiple iterations, and there is a high percentage of mature and part-time students. Consistency of approach to delivery is paramount, but very few flexible learning environments existed. It was from this premise that our bespoke solution, WOLF, was developed – answering a need to embark upon a radical appraisal of all learning and teaching aspects.

WOLF is primarily designed to SUPPORT existing delivery mechanisms and not replace them. It is for this reason that the configuration of WOLF is primarily for on site use. This is particularly important when high bandwidth materials such as video and audio streaming are used.

The availability of technological environments within the University enabled rapid progress to be made, i.e. multi-site delivery required streaming media, which used the fast broadband campus technology already in existence.

The major concerns locally were the nature of existing legacy systems within the University and their interaction with any new major application or technology. Whilst student administration was not considered to be the major driver, the consequences of ad hoc imports from student records, finance and personnel would have been a severe impediment to progress. The task group at Wolverhampton considered that the major driver for a learner supported technology environment must be within the pedagogy, not driven by the technology, although the hardware platform was assumed to be available and at the required level of interactivity.

At the simplest level we needed to consider the process model, adapted from a previous model developed at the ALT Conference 1999.


Technology
Core materials
Access to other resources
Learning resources
Customised resources
Desires/ negotiated outcomes (Knowledge, behaviours, process, skills)*
Activities
Assesses outcomes (Process and outputs)

* *this is the first issue with both staff and students. The activities are then developed as a consequence of the outcomes. Learning resource development does not start with the technology.*

Higher education, like other sectors of society, has undergone a technological revolution. Today's students often arrive at college or university with considerable experience of computer use. As well as the university library, they want access to the resources of the Internet and World Wide Web. They communicate using email, electronic chat rooms and personal Web pages. They are expected to word process their assignments and may well be familiar with spreadsheets, databases, desk top publishing and presentation software, either from school or from work experience. Rising participation in higher education, especially among non-traditional students, has placed a new emphasis on individual needs and learning styles at a time when classes are actually growing larger.

In line with these changes and expectations Wolverhampton, via a research project called BroadNet (an advanced technology infrastructure to support SMEs in the black country), identified the ability and opportunity to utilise this same platform to deliver training, learning and teaching to the core BroadNet members (SMEs) and the wider University. The initial developments were focused on learners studying largely in isolation, with off site delivery of material via a web browser. Initially, interaction between tutors and students was limited to bulletin board systems. As it developed, academic staff were encouraged to suggest facilities for the environment which they felt would enhance the learning experience for students.

The main driver, pedagogy and learning, has already been espoused, but is based on the need to create a shift away from the 'transmission' model of lecture-based courses to one where students take greater responsibility for their learning, i.e. independent, self-directed learning. However, lectures do have a role in motivating students and maintaining a sense of common purpose, and increasingly, lecturers are deploying student-centred activities that encourage them to reflect on the lecture content and provide the opportunity to refresh their concentration.

Online Learning

Implementing an online learning environment should not be a daunting challenge. However, the planning process for a full-scale implementation involved not only decisions about technology and infrastructure, but financial models, curriculum design and assessment, all of which required lengthy reviews and input.

Technology based learning is NOT just putting the lecturer in the machines. Learning is about retention – we needed robust mental models and the infrastructure to support such models.

Too many IT based learning systems focused on the technology being able to do 'clever' things! Whilst this was a requirement, it was an assumption for WOLF, and a basic tenet for developing a bespoke platform. We were clear within Schools that the simple transfer of teaching and learning to a computer in a form already used in the classroom, which then expected magical improvements in learning, could only engender disappointment at the results.

Teaching and Learning Strategies

The emphasis within WOLF is on developing online support, independent motivation and active facilitation NOT wholesale replacement of academic input. Biggs and Telfer (1987) suggest that the following kinds of teaching foster deep approaches:

- an appropriate motivational context
- a high degree of learning activity
- interaction with others, both peers and teachers
- and a well-structured knowledge base.

This is further reinforced by Laurillard (1993) who suggests a number of key aspects of learning that can be used in any discussion about teaching strategies. These aspects are:

APPREHENDING STRUCTURE. Students construct meaning as they read, listen, act and reflect on the subject content. However, as Laurillard points out "Meaning is given through structure"(p51) and it is therefore essential that students are able to interpret the structure of any discourse before they can construct the meaning that we have previously seen to be so crucial to understanding. Students adopting the surface approach to learning would fail to do this, as they focus on memorising a number of phrases and points for later reproduction.

INTEGRATING PARTS. Students need to be able to integrate the signs of knowledge such as language, symbols and diagrams with what is signified by them.

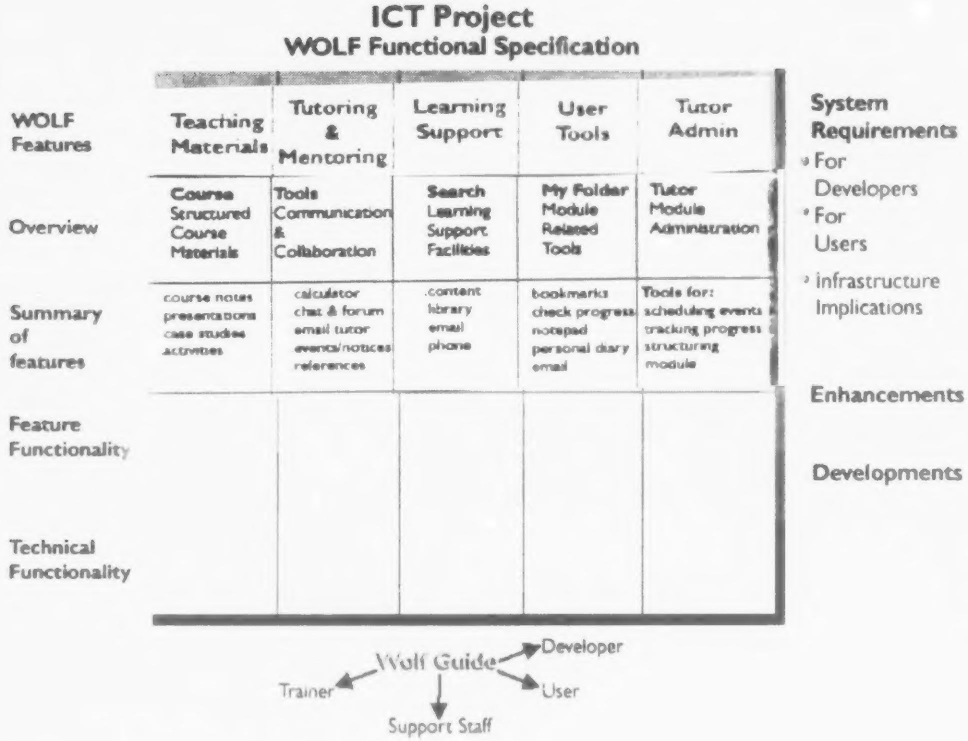
ACTING ON THE WORLD. There are few teachers who attempt to teach without asking students to do something, whether it be laboratory sessions or essay writing. Students are asked to engage in some form of activity which, when integrated with other activities, assist in understanding of content.

USING FEEDBACK. Actions such as those mentioned above are futile for student learning, unless feedback on individual actions is available.

REFLECTING ON GOALS-ACTION-FEEDBACK. Learners interpret and understand reality as they make links between each of the above aspects by reflecting on the goals of learning, actions taken, and the results of those actions.

It was on this basis that WOLF has developed, 'it' assumed the student to be a reflective learner (Kolb cycle) and the emphasis with the technology is on facilitating the movement around the cycle.

The development was based on identified and future, perceived and anticipated needs of all the potential WOLF community – developers, students and those responsible for the infrastructure.



ICT Project
WOLF Functional Specification

WOLF Features	Teaching Materials	Tutoring & Mentoring	Learning Support	User Tools	Tutor Admin
Overview	**Course** Structured Course Materials	**Tools** Communication & Collaboration	**Search** Learning Support Facilities	**My Folder** Module Related Tools	**Tutor** Module Administration
Summary of features	course notes presentations case studies activities	calculator chat & forum email tutor events/notices references	.content library email phone	bookmarks check progress notepad personal diary email	Tools for: scheduling events tracking progress structuring module
Feature Functionality					
Technical Functionality					

System Requirements
- For Developers
- For Users
- infrastructure Implications

Enhancements

Developments

The last 2 rows are currently being developed and will feature as a separate entity

General Course Content

Teaching Materials are displayed in the main frame of the screen to form the basic structure of reference material for a module. The module notes are typically arranged in a hierarchical structure with levels of module, units, sections, subsections and pages. Tools have been developed to semi-automate converting existing word processed documents into WOLF HTML pages. These tools help to speed up the creation of WOLF modules to enable academics to focus on the pedagogy.

The inclusion of other media such as images, video, sound and animation within the notes is possible in WOLF, adding topical interest to a screen of text.

Case Studies, Presentations and Activities

Case studies, real or fictitious, may be used to illustrate key topics. With the wealth of material available via the Internet, embedding links to reliable external sites can make the latest information pertinent to particular cases easily accessible from within the learning environment.

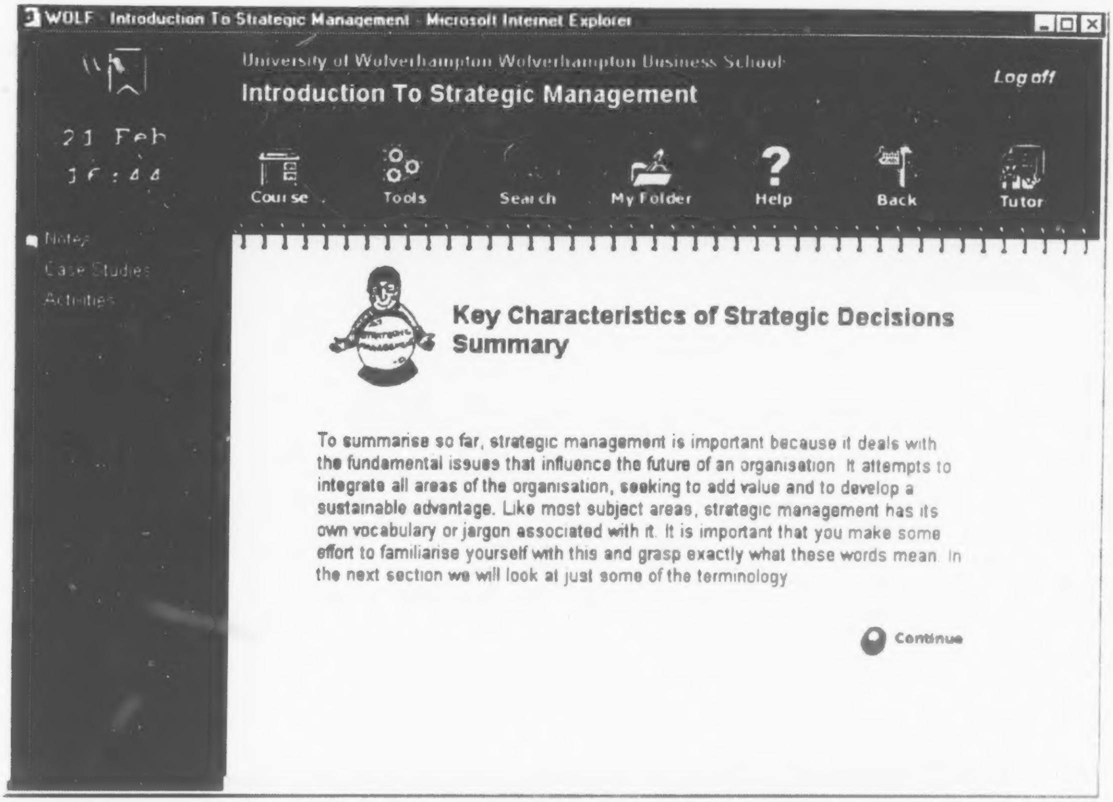
Presentations consist of a sequence of screens, effectively a slide-show of material. The student has controls to proceed through the slide-show at their own speed. Presentations may include a voice-over soundtrack to complement the content.

Using presentations can be an effective accompaniment to text based Notes, a useful recap of lecture presentations, or a complement to certain aspects of the material which require more detailed presentation.

BEST COPY AVAILABLE

Activities provide a way for the student to assess their own understanding of course material. A number of formats are possible, including model answer, multiple choice, fill in the blank and true/false questions.

On submitting their answers, the students receive immediate on-screen feedback in the form of suggested or correct answers, from which they may ascertain their progress within the material.


WOLF - Introduction To Strategic Management - Microsoft Internet Explorer
University of Wolverhampton Wolverhampton Business School
Introduction To Strategic Management
Log off
21 Feb
16:44
Course
Tools
Search
My Folder
Help
Back
Tutor
Notes
Case Studies
Activities
Continue

Key Characteristics of Strategic Decisions Summary

To summarise so far, strategic management is important because it deals with the fundamental issues that influence the future of an organisation It attempts to integrate all areas of the organisation, seeking to add value and to develop a sustainable advantage. Like most subject areas, strategic management has its own vocabulary or jargon associated with it. It is important that you make some effort to familiarise yourself with this and grasp exactly what these words mean. In the next section we will look at just some of the terminology

The Standard Wolf Interface. The facilities across the top of the screen are common to all modules. The Course Notes, Case Studies and Activities are specific to the module.

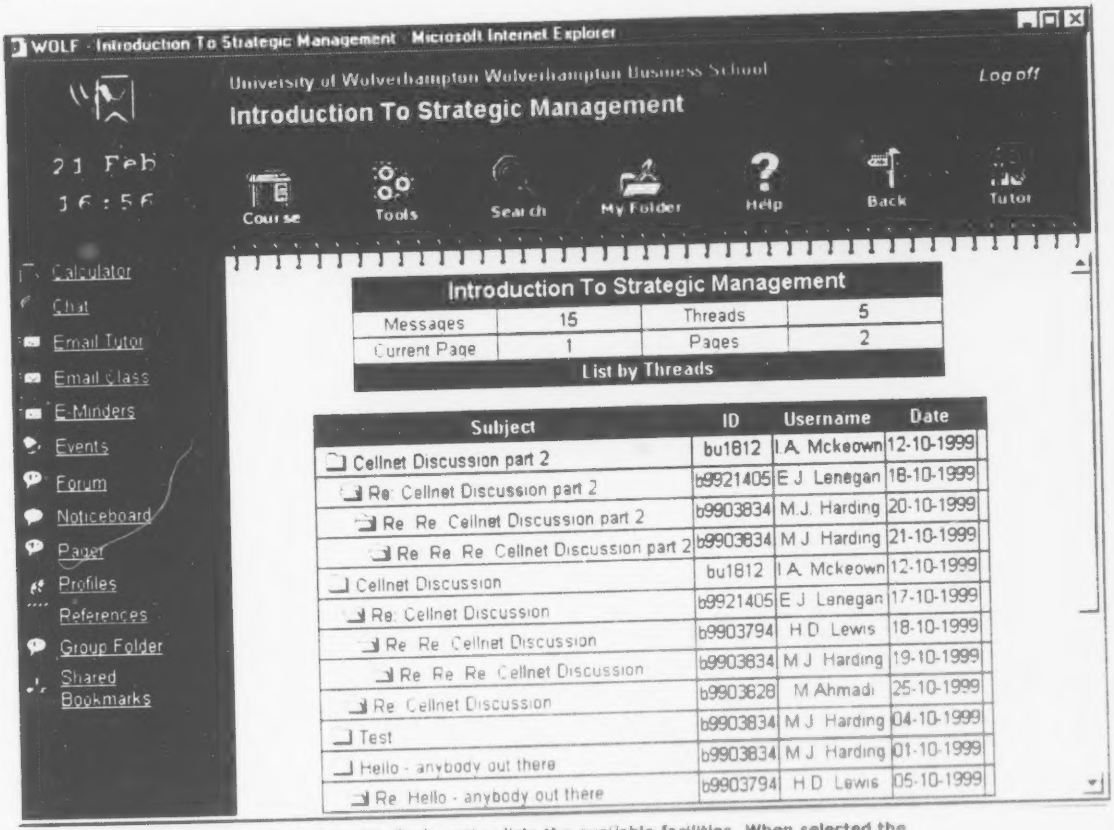
Tutoring and Mentoring Communication Tools

The WOLF interface is designed to be much more than a delivery mechanism for distributing course notes to students. There are a range of tools built into the system to allow students to get the maximum benefit from the online learning environment through communication, collaboration and the posting of module-specific notices and events. A key part of any learning program is discussion of topics in the subject area. Whether the discussion takes place in a tutorial, over coffee or over the Internet, students should be encouraged to debate key areas of their subject.

BEST COPY AVAILABLE

To facilitate discussion several communication features have been incorporated into the WOLF learning environment:

- Forum
- Chat
- Pager
- E-mail Tutor
- E-mail Class



WOLF - Introduction To Strategic Management - Microsoft Internet Explorer

University of Wolverhampton Wolverhampton Business School

Introduction To Strategic Management

Log off
21 Feb
16:56
Course
Tools
Search
My Folder
Help
Back
Tutor
Calculator
Chat
Email Tutor
Email Class
E-Minders
Events
Forum
Noticeboard
Pager
Profiles
References
Group Folder
Shared Bookmarks

Introduction To Strategic Management			
Messages	15	Threads	5
Current Page	1	Pages	2

List by Threads

Subject	ID	Username	Date
Cellnet Discussion part 2	bu1812	I.A. Mckeown	12-10-1999
Re: Cellnet Discussion part 2	b9921405	E J Lenegan	18-10-1999
Re Re Cellnet Discussion part 2	b9903834	M.J. Harding	20-10-1999
Re Re Re Cellnet Discussion part 2	b9903834	M J Harding	21-10-1999
Cellnet Discussion	bu1812	I A Mckeown	12-10-1999
Re: Cellnet Discussion	b9921405	E J Lenegan	17-10-1999
Re Re Cellnet Discussion	b9903794	H D Lewis	18-10-1999
Re Re Re Cellnet Discussion	b9903834	M J Harding	19-10-1999
Re Cellnet Discussion	b9903828	M Ahmadi	25-10-1999
Test	b9903834	M J Harding	04-10-1999
Hello - anybody out there	b9903834	M J Harding	01-10-1999
Re Hello - anybody out there	b9903794	H D Lewis	05-10-1999

Clicking on the Tools option lists the available facilities. When selected the tools appear in either the main window or in a separate pop-up window.

Forum

To enable discussion, the Forum allows students and staff to send messages which can be read by anyone with access to the module.

Forum users may respond to existing messages or create entirely new topics for discussion - in this way the discussion evolves. Students can join in with the Forum discussions at any point in time.

Messages remain in the Forum until an administrator removes them. With tutors monitoring the discussion, debate can be guided to keep subjects relevant to the module's progression.

BEST COPY AVAILABLE

Chat

Chat creates a live 'virtual' meeting. When a user logs into Chat they see messages from other users seconds after they are typed and sent. Chat messages are listed in order, the last message sent appearing at the top of the list. Messages can be sent to all users or just to a participant selected by name. Additional Chat areas can be created during a session, enabling small groups of participants to move from the main Chat area to a topic specific Chat area.

Chat is 'live' in nature, so messages are not saved - as soon as a user leaves the Chat area all messages are lost from their view.

Pager

The pager facility enables anyone logged into the system to send a text message to another user. The message will appear on the recipient's screen in a pop-up window. The pager is an ideal tool for tutors to contact students with informal messages and can be used to good effect to set up a live chat session.

E-mail Tutor

This tool enables students to e-mail a module tutor from within the learning environment. The user and the tutor's e-mail addresses are automatically inserted and a default title is included. If there is more than one tutor involved in the course the user may select the correct tutor from a drop down list.

If the student is involved in group work there are facilities to enable them to copy ('CC' or 'BCC') the email message to other group members and the tutor.

E-mail Class

This option has been created to allow global emailing of the entire class.

Group Folder

The Group Folder is designed to be a repository for materials for the group. Both students and tutors can upload and download files within the Group Folder area. Materials uploaded can only be removed by the person who uploaded them or a tutor. Generally tutors use the facility to distribute notes, case studies and other printed materials.

Shared Bookmarks

The Shared Bookmarks facility enables anyone to upload a web page reference. When a new link is added, the originators name is listed next to the link. This ensures that credit is given to the person who has found the resource and that only suitable links are added.

Module Information Tools

To convey module related information to students, three features have been incorporated into WOLF:

- Events Calendar
- Noticeboard
- E-Minders

Events Calendar

The Events Calendar appears in a new window with a single month in view. It displays date specific information relating to the module, e.g. assignment deadlines, tutorial dates, and scheduled examination dates. Selecting a highlighted date shows event details for that date.

Noticeboard

This area is intended for general notices that are not time or date specific. The Noticeboard function displays a list of notice titles, which are links to each full notice.

The Noticeboard is administered by course tutors.

E-Minders

The tutor can use this function to remind students of specific events or important activities. Students are also able to create these, which are effectively scheduled emails.

References

The references section is used to store information on relevant texts, web links and other materials such as videos and CD-ROMs. Each type of reference media is stored in a separate subsection with list items defined by course tutors.

Each reference includes a short abstract.

Calculator

A standard calculator with a full set of scientific functions is included in the learning environment should calculator functions be required by students for any module.

Learning Support – Search Options

The strength of the WOLF platform is the range of resource facilities which are built into the environment. With options to search various online resources at the University of Wolverhampton, students can access resources to support their studies without having to leave the learning environment.

The Search menu provides the user with the following options for learning support:

- University Library
- Staff/Student Email
- Staff Phonebook
- Who's Here

The Library search has a direct link to the OPAC system which, amongst other things, enables students to locate material held by the library.

Linking directly to the University's website, students can search the student database for e-mail addresses or the staff database for tutor e-mail addresses and daytime phone numbers.

Who's Here simply informs you who else is currently online in that module.

User Support

Each student using WOLF has access to a number of tools which store customised information to help them through their studies.

The information is held centrally in an individual student profile section on the WOLF server. Students can therefore log in to WOLF from any computer and still have access to their own specific information.

The following support tools are accessible from the My Folder menu:

- Bookmarks
- Check Progress
- Notepad
- Personal Diary
- Email
- To Do

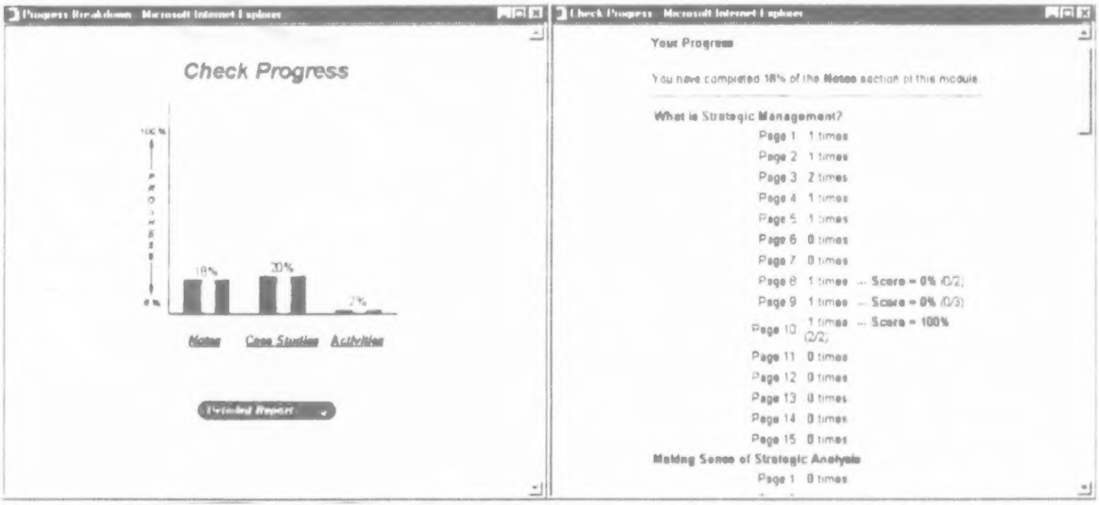
Bookmarks

This allows students to electronically bookmark a page that they have found useful or significant. The Bookmarks remain in the list until the student deletes them.

Check Progress

As students work through the course, a file is created which logs their access to the material. Both students and tutors may view this file via the Check Progress option.

Each page is listed, with a marker indicating how many times they have viewed the individual pages. There is also a percentage rating to indicate how much of the course material has been viewed.


Progress Breakdown - Microsoft Internet Explorer
Check Progress
100 %
PROGRESS
0 %
18%
20%
2%
Notes
Case Studies
Activities
Detailed Report
Check Progress - Microsoft Internet Explorer

Your Progress

You have completed **18%** of the **Notes** section of this module

What is Strategic Management?

Page 1 1 times
Page 2 1 times
Page 3 2 times
Page 4 1 times
Page 5 1 times
Page 6 0 times
Page 7 0 times
Page 8 1 times -- **Score = 0%** (0/2)
Page 9 1 times -- **Score = 0%** (0/3)
Page 10 1 times -- **Score = 100%** (2/2)
Page 11 0 times
Page 12 0 times
Page 13 0 times
Page 14 0 times
Page 15 0 times

Making Sense of Strategic Analysis

Page 1 0 times

Students can check their progress through the material, Initially via a simple graph or if more information is required a detailed list can be viewed.

BEST COPY AVAILABLE

Notepad

The Notepad is a simple text editor that enables students to type and save notes about material as they work. Students can copy and paste text into the notepad from the content using standard keyboard shortcuts, and annotate around these excerpts for context, if they wish.

Personal Diary

This is a personal version of the Events Calendar and is accessible by the student from all WOLF modules. Users enter their own information into the diary which remains completely private.

Email

The e-mail tool allows the user to access their University e-mail account held on the University mail server. E-mail messages are retained on the mail server, so students can retrieve the message more than once, from different computers.

To Do

This is a basic 'to do' list which allows students to prioritise their workload by level of importance. It can be viewed by the student from any WOLF module.

Tutor Administration

The tutor administration tools enable course tutors to tailor and manage the functionality of the WOLF learning environment specifically for their module.

These administration tools are only available if the user logging in to WOLF is registered as a Tutor on a module by the main module administrator (who is assigned when the module is created).

Managing Course Information

The WOLF learning environment provides students with several course information features in the Tools menu.

The tools to manage these are provided for tutors:

- Events
- Notices
- References

The Events calendar facility enables tutors to add, remove or update entries in the Events section of the Tools menu available to students.

The Noticeboard option enables tutors to add new messages to the Noticeboard. Features included are options to update existing notices and delete those which are no longer required.

The References administration tool enables tutors to add, remove and update the References for the module. The update includes text based references and Internet web link references. There are options to include extracts from references, and outline details of website content.

Administering the Forum

The Forum tool gives tutors administration access to the discussion Forum. Tutors can delete messages according to their date, their sender or their content. This feature may be used to keep the threads of discussion in the Forum topical to the module.

Tracking Progress

The Tracking tool enables tutors to view the progress of registered students through the online material. Tutors select individual students from the list to see the percentage of the total content that each student has viewed and how many times individual pages have been visited.

Setting up the module

The creation and ordering of content in a WOLF module is defined by the tutor using two administration tools:

- Menu
- Navigation

The menu function is used to create and change the index list of pages in a module. Tutors can update the file to include new pages of content (Notes, Activities, Case Studies or Presentations) or delete old pages as required. There is also the option to set up new sections and subsections.

In a similar way to the Menu function, the Navigation tool lets tutors define the sequence in which the pages are shown. This controls the flow of the module's content.

Configuring the WOLF Interface

Some tutors may choose not to have all the functions of the WOLF interface available to students. The Configuration tool enables tutors to select which options are available within their own module via a check box list. The default option is for all facilities to be available.

REFERENCES

Association for Learning Technology. Conference (ALT-C 99). (199). University of Bristol.

Biggs, J.B. and Telfer, R. (1987) The Process of Learning, (Second Edition), Sydney: Prentice-Hall.

Laurillard, D. (1993) Rethinking University Teaching: a framework for the effective use of educational technology, Routledge: London.

O'Donoghue, J (1999), On-Line Supported Learning - Comparison of the Major Package Solutions (unpublished).

Networked Learning in Applied Science Education

Jutta Pauschenwein and Anni Koubek, FH JOANNEUM, Graz, Austria

Challanges in Applied science tertiary education

In addition to traditional universities, within the last 5 years a number of applied science tertiary education programs ("Fachhochschulen") have been developed in Austria. The reason for this development was to install programs which are targeted to specific industrial needs and provide shorter, more targeted education. The courses are industry-oriented, compact and integrate theoretical knowledge with practical know-how.

The didactical framework differs quite substantially from traditional university courses. The cooperation with industry accompanies the student through the whole study course. The majority of lecturers are working in industry and teach only part time. Projects in cooperation with industry, often including several subjects, are posed in a group oriented approach, starting from the very first year. The complexity and professionality of such projects increases during the study time. Also each student works at least half a year with a company. This practical work is an integrated part of the courses and followed up by the teaching staff.

Currently the FH Joanneum offers 9 study courses, all in very specialised, technologically oriented fields, such as automotive engineering, industrial design or construction planing and management.

Such an open organisational concept of studies provides many opportunities for implementing innovative strategies for networked learning. The knowledge space, in university often being a closed system, in this case becomes an open networked system, including the university, the companies of the lecturers and benefiting companies of project work. In order to profit and manage this augmented knowledge new technologies can play an important role as well as new didactical concepts can give more power to the individual learner.

The challenges for the university in this context are quite substantial. On the one hand, traditional patterns of teaching are deployed, and therefore structured learning processes need to be supported. On the other hand, now the university is also confronted with knowledge management processes, up to now only considered important in companies.

ICT processes for each of the scopes are traditionally designed differently. Whilst learning platforms are focused on the *delivery* of knowledge, knowledge management systems concentrate on the *creation* and *management* of knowledge.

The trainers at these courses are faced with several challenges The trainer has stopped to be the only know-how carrying person in the process. If the trainer wants to keep the overview of the created knowledge, s/he has to use the students as knowledge resources as well. In this way the process becomes one of cooperative knowledge construction, definitely differing from classical learning scenarios.

The Internet, providing a large number of possibilities of finding information, can support substantially such integrated concepts of learning. However also the ICT applications often support only one of the many functions needed in such a pedagogical concept. Therefore the work of the "Centre of Multimedia and Learning", being responsible for the set up of the technological support for these applied science courses, tries to take a formative and exploratory approach.

In the centre of the attention is always the learning group – that is the tutor and his specific group of students. A more detailed description of the approach and results will be given below.

Didactic constraints and possibilities

Before describing the FH JOANNEUM approach, a more detailed description of the organisation of courses is given, in order to define the didactical constraints and possibilities.

As mentioned, a large number of trainers is not permanently employed by the FH JOANNEUM, but rather working in industry and teaching on a part-time appointment. The lecturers at FH JOANNEUM are highly qualified and in many cases are working in management or decision making positions within their companies. Therefore, from their sid time is a very precious good and in the organisation of study plans, flexibility and odd times have to be accepted by the administration and students. Further, those lecturers are not involved in the day-to-day management and supervision of students. They need structured, additional information from the permanent staff, in order to be able to integrate their courses into the overall curriculum.

For the lecturers usually face-to-face contact to the students is extremely important, since they see their role not only in giving them explicit knowledge, but also their personal, tacit knowledge about how facts and methodologies connect to business or development processes. On the other hand, because of time constraints they are glad about information provision and communication support, giving them the chance to have a continuity in their relation to the students even though they are not permanently present.

Lecturers working on a full time schedule are faced with different problems. They usually have a very high teaching load (up to 7 classes in parallel) and in addition take on the load of accompanying student projects and setting up connections with customers in addition to their normal F&E duties within the university. They desire an efficient course management, guaranteeing re-usability of components as well as knowledge management and cooperative work support in order to sustain the project work.

Because of such diversified needs, also the solutions have to be tailored individually. Depending on the individual situation, a lecturer will choose a different approach for supporting his/her course. Designing solution therefore becomes a bottom-up processes, putting the individual needs of each lecturer and his/her group of learners in the centre of attention.

The Centre for Multimedia and Learning has been systematically evaluating for the last several years a variety of concepts for tele-learning and computer aided instruction for different target groups [1]. This has resulted in a didactical working hypothesis which serves as a basis for all other developmental steps at the FH JOANNEUM. These hypothesis can be summed up as follows:

Media must be applied or used in the context of the material being learned and the individual learner. The use of media in lesson is only meaningful when there is as true added value for the learner in the learning process.

Our premises are based on constructivist foundation and we differentiate between three principal kinds of support for the learning process:

- Support for knowledge acquisition
- Support for situated cognition
- Support and development of a social learning environment

The choice of media for the specific areas depends on the needs of the individual learner. From this working hypothesis automatically arise practical consequences which will be explain further with the help of several evaluation examples:

- There is no "best" medium for a specific area or learning institution. The context depends on the specific situation of the individual learner.
- The greater the variety of media available to be used the more flexible one can be concerning the individual needs of the learner.
- This means that media independent design will become increasingly more important.

- The support of lecturers in this case at the FH must be problem oriented. Other lecturers and learners have other needs.

The virtual campus

Within the FH JOANNEUM the Centre for Multimedia and Learning is running a virtual campus offering the possibility of web-based courses and supporting the lecturers in the use of this medium. Beyond the technical equipment, services like continous backups of files, a hotline in the case of problems, the Centre for Multimedia and Learning provides know-how about the skills to develop web-based courses ranging from simple html pages to webdesign, treatments, storyboarding.

The virtual campus is located on an apache webserver under linux, providing

- webspaces (eventually password protected)
- mailing lists
- the tele-learning platform WebCT.

The webspaces are used to present dynamic information of the various study courses including homepages of projects, information for students and so on. Presently five of the 9 study courses of the FH JOANNEUM are using these services.

Another part of the webspaces serves the presentation of current international projects. They contain information about the project, the possibility to present the current state of the project and a password protected part for the communication within the project. Mailing lists are an important service for the communication in a project, often the whole transfer of data is managed by a mailing list.

The most important service for teaching is the tele-learning platform WebCT, a web-based, network learning environment. The platform offers instructors and students the possibility to access and create content in a easy way and to make interactive web-based learning experiences. WebCT provides flexible delivery of educational material and enables communication, interaction and collaboration between students and instructors.

The platform includes the above described service of webspaces and offers a lot of additional services. One of them is the construction of learning paths, providing a structure to the learning material. The instructor can upload all documents of the lessons into the platform and afterwards try to build one ore several presentations (learning paths) of his material, e.g. an overview of the lesson, a learning path for beginners and another learning path for advanced students.

Within the course the communication tools are used to establish contact between students and between students and tutor. The simplest service is the email forum, in addition there is the possibility to configure a chat with several rooms. In the bulletin board students and lecturers have the possibility to post news and material.

There are several types of quizzes, ranging from selftests to multiple choice. A glossary contains keywords of the presented educational material.

The instructors are the designers of the courses and have to become acquainted with the WebCT features. The Centre of Multimedia and Learning offers workshops and seminars concerning multimedia in teaching, didactic concepts and a introduction to WebCT. As a result of the seminar the trainers should be able to use the different tools nearly without further help because the tools are relatively simple and always to handle in the same way. The student management and the tracking of their learning efforts can also be accessed easily by the trainer.

Another challange to the trainers is the new way of communication with the students as opposed to the traditional patterns of the face-to-face instruction. They will only meet the students from time to time (depending on the agreement between instructor and students), additionally there is the permanent possibility to contact the trainer via email. On the one hand this signifies less direct presence of the instructor, but on the other hand the trainer can be contacted in a simpler and easier way.

Evaluation results

In the following, some practical evaluation results are described, which have been carried out on lectures within the FH JOANNEUM in the years 1998 - 1999.

In the winter semester 1998/99 a lecture series "Information Science" was held in the framework of the information management studies. As part of the lecture the learning platform WebCT was set up to fulfil several functions:

It enabled the lecturers to store the learning materials for the respective lecture which the students could then download and work through before or after. Groups were formed and given specific tasks for the following lectures. In the bulletin board comparable to a blackboard or a newsgroup the students and lecturers had the possibility to post news and material. Furthermore communication outside the lessons between the students and lecturers was supported within the platform as well as through individually chosen mail programs (i.e. Outlook, Netscape). No paper script was produced or distributed.

Basically the students were convinced by the usefulness and necessity of new technologies at the FH Joanneum in their studies. 97% voted for an intensive mandatory use and 3% on a voluntary basis. The students saw the greatest advantage of the internet in data acquisition which the following quotes support: "The internet is an almost inexhaustible source of information ......large variety of information ....students have fast access to current information ....makes the lecture more relevant". The availability of the learning materials via WebCT was viewed favourably by four fifths of the students asked.

In contrast, disadvantages named were technical problems and difficulty with the overview of stored materials. One aspect of online communication however received quite the opposite evaluation. The reaction to the point WebCT is ideal for communication with the project group can be summed up as follows. The majority of the respondents (81%) evaluated communication via Web CT as unusable and never used it, 6% found it well suited, but not user friendly and a further 4% responded it had promoted their participation in the course. One explanation of the high disapproval for Web CT bulletin boards may be that the students are in constant personal contact and therefore spontaneous communication via electronic media is indeed superfluous.

Further WBI-oriented lectures were "System theory", "Estimation of results of technologies" and "Ecological technology". The complete teaching material was updated to an internet standard by "classical" information-carriers (paper and word processing, Word) and was made accessible via WebCT. Written paper-scripts did not exist. Students could work through the scripts either before or after. An extract of the online script was worked through during the lecture. Groups were formed and individual seminar assignments which were administrated and delivered online, were given to the students. During the design of the course presentational Design ("Webdesign") was of minor importance since only the lecturer was responsible for the production and conversion of the classical material.

Additionally, he had to become acquainted with the WebCT features which allowed him to innovate by giving tests followed by an immediate evaluation.

In the lectures as well, the Web as principal instructional method was positively approved, with over 80% of the students finding it very good or good and only 5% „unusable" or „unnecessary".

However, nearly half of the students wanted a paper script which they could use to follow and make notes in. Also, approximately one third of the students criticised the design of the Web lecture with regards to scope, structure and design as needing improvement. At the same time a significant number of students said they were distracted during the lecture by surfing or mailing.

We therefore conclude that the simultaneous processing of learning material through an open learning system during the lecture is not productive and recommend rather that the lecture material be placed online for preparation or repetition. The lecture itself should be held in „classical" fashion, working interactively with the students by discussing and presenting the prepared material. There was practically no spontaneous communication in the lectures; in contrast, the Bulletin Boards became the main support of stimulated communication with regards to the presentation and documentation of the project tasks.

During winter semester 1999/2000 the learning platform was used in the lecture "Industrial Management I". The original material, a paper-script, was automatically converted in html and integrated into the platform. Additional informations such as scanned graphics were added. The students splitted into several groups had to work through the material before the lecture, prepare summaries and solve tasks relevant for the understanding of the material. A lecture was held every two weeks that allowed the students as well as the instructor to discuss the results and solve occurring problems. The students could communicate via email with the instructor, discuss open questions within their group under supervision of the instructor and enter the chat to meet their colleagues.

The students response to the ICT was high (86%). They liked the greater flexibility in their timetable and the control over their own learning. The mixture of virtual and real lecture was positively approved. The students got along well with and had no problems finding and downloading materials. However some of the students took a printed version of all topics of the lecture at the beginning in the semester and never entered the learning platform again. Altogether they evaluated the possibilities of online communication critically, there were positive (44%) and negative (49%) reactions. The chat wasn't used frequently because there was a relatively high personal contact of the students caused by the attention of the other lectures.

The reports on seminars show how the students appreciate and like the media WBI. On the other hand however, they show a strong preference for paper-versions, i.e. paper-scripts. We assume that the importance of complete scripts will decline due to online courses as well as to an enormous increase in WBI design.

The target group of teachers interested in WBI shows remarkable features: They are familiar with internet, they are fond of experimenting, they are very disciplined when dealing with resources, they aim at new efficiency or better learning results in the courses and they wish to increase the contact and communication with the learners. Some trainers already developed precise concepts how to adopt the new media in their teaching whereas others are beginners and in this respect learners and investigators of the new possibilities presented by the internet, as well as the use of multimedia products. For the advanced group the service of providing a functional platform or webspace is sufficient. The group of beginners/learners needs an intensive coaching to develop the necessary skills for a productive use of the new media. Our experience demonstrates that one needs to begin with simple tasks, step by step, in a bottom-up process. Working on the lecture (maybe only converting a paper-script and uploading it in the telelearning platform) and using the platform with the students can cause a lot of new ideas which can be realised in the next course.

The virtual campus of the FH JOANNEUM expands rapidly. The number of teachers interested to use the possibilities of WBI increases constantly. In the process of supporting the instructors and developing new modules for the train-the-trainer program the team of the Centre of Multimedia and Learning gets more efficient and experienced. What is worth to emphasise is the intrinsic factor of democratic relationship between trainers, students and the supporting team in the field of networked learning. All the three groups involved in this process are learning and profiting from each other.

In order to support asynchronous learning and to minimise the learners' need for having a printed version we will focus on the development of an adequate Web-design of the teaching materials.

Apart from the support of the above-mentioned courses, in near future, FH JOANNEUM expects to offer "dual courses2, where students are permanently employed at a company, but change every three months between courses at the university and practical work at the company . This approach requires an even closer integration between learning context and work-space. Setting up support systems for such courses will benefit heavily from the experiences drawn from the last years at the courses and provide a challange in integrating structured learning with knowledge management systems.

References

1. Aviram, A. Personal Autonomy and The Flexible School. International Review of Education 39(5): 419-433 (1993).
2. Berge Z., Collins M., *Computer-mediated scholarly discussion groups*, Computers Education, vol. 24, no. 3, pp 183-189, 1995.
3. Checkland P., Holwell S., *Information, Systems and Information Systems*, Wiley 1998.
4. Collis B., *Tele-learning in a Digital World: The Future of Distance Learning*, International Thomson Computer Press, 1996.
5. Hodgson B., *Key Terms and Issues in Open and Distance Learning*, Kogan Page, 1995.
6. Jonassen D.H. & Reeves T.C., *Learning with technology: Using computers as cognitive tools*, In Handbook of research on educational communications and technology, ed. D. Jonassen. Scholastic Press: New York, 1996.
7. Jonassen D.H., *Thinking Technology*, Educational Technology, April, pp. 34-37, 1994.
8. Kemp, Morrison: Ross: *Designing Effective Instruction*. Prentice Hall. 1996.
9. Koubek A., *How much Design does Learning need?* Proceedings "ONLINE EDUCA", Berlin 1998
10. Koubek A., Will on-line educational multimedia become a mainstream learning support medium? IN-TELE Conference, Jena, Sept. 1999
11. Laurillard D, *Rethinking university teaching: A framework for the effective use of educational technology*, Routledge: New York, 1993.
12. Lo S., Koubek A., Jandl M: *Telelearning at FH Joanneum, Concepts and Experience*, Proceedings of ICL, Villach October 1999.
13. Phillips R., *Developers guide to interactive multimedia: A methodology for educational applications*, Curtin University: Perth, WA, 1996.
14. Scheckel P., Holz H., *Evaluation multimedialer Lernprogramme und Lernkonzepte*, BW Bildung und Wissen 1995.
15. Strauss R., Managing Multimedia Projects, Focal Press: Boston 1997.

Evaluating CHAT Seminars within a WebCT Networked Learning Environment

Rachel M. Pilkington
Computer Based Learning Unit, The University of Leeds.
[e-mail: R.M.Pilkington@cbl.leeds.ac.uk]

Catherine L. Bennett
Department of Psychology, University of York.
[e-mail: C.Bennett@psych.york.ac.uk]

Keywords: **Computer Mediated Communication, Dialogue, Networked Learning.**

Abstract

An evaluation of a taught module "Learning and the New technologies" within a Post-Graduate Master of Education course "IT and Multimedia" is reported. The evaluation forms a case study of the use of Information and Communication Technology (ICT) to provide learning support for part-time, full-time and (potentially) distant students. Students on the course are mainly teachers learning for continuing professional development. A Virtual Learning Environment (VLE) was developed using WebCT and use of the environment was evaluated in relation to the quality of work produced by students and the nature of their interaction through the ICT tools. CHAT seminars discussed issues arising out of students' reading of set papers. These provided a reflective discussion forum to engage in Exploratory Dialogue. The evaluation of student use of the VLE raised the issue of how to increase the participation of some students in on-line CHAT and group-work. Further issues included how to structure courses to meet the needs of full-time, part-time and distant students with different needs.

Introduction

Why Networked Learning? The student base is changing - those wanting to take post-graduate courses are no longer only recent graduates - they are diverse in prior knowledge and experience. Increasingly, students need to balance work and family commitments with the demands of learning new skills (McCombs, 1991). As a consequence Educational Institutions must respond rapidly and flexibly to meet students' needs.

> *"Britain towards 2010 published by the Department of Trade and Industry says students no longer need to be resident at universities...The document dismissed objections about face to face interaction between student and teacher - for most students it does not happen under traditional methods - and lifestyle". (Donald MacLeod reporting in the Guardian HE., 25th January 2000).*

The argument is that, using ICT, flexibility can be provided for students living and working at locations distant from the University. However, to be effective ICT must meet requirements of quality. How do we meet these requirements given constraints (largely financial) which inhibit face to face teaching? We not only need courses that deliver informative content but also develop practical ICT skills, critical thinking skills and stimulate students to become autonomous learners.

A Design Grounded in Learning Theory

Theories of learning suggest deep conceptual understanding and the development of intellectual skills require active, constructive tasks (Piaget, 1970), that provide scope for verbal interaction (Vygotskii, 1978). Collaborative Learning exposes students to new information and alternative perspectives encouraging them to reflect on and revise conceptions (Blaye, Light, Joiner & Sheldon 1991; Littleton & Light, 1998). Exploratory talk (inquiring, explaining and justifying) is particularly beneficial for these purposes (Mercer and Wegerif, 1999). From the above discussion any Learning Environment should provide opportunity for:

- **Acquisition** - new knowledge needs to be acquired through exposure to new information.
- **Articulation** - students need to test acquisition through interaction with peers and tutor.
- **Application** - to develop skills, knowledge must be applied in constructive tasks.
- **Assessment** - students need constructive feedback if they are to set and re-set learning goals.

Applying these criteria to the design of Networked Learning we have developed the following pedagogical approach (Barker & Pilkington, 2000):

- **Acquisition** - students can learn at their own pace through access to on-line notes. These replace lecture notes enabling more articulation and application in face to face time.
- **Articulation** - Computer Mediated Communication (CMC) CHAT and Bulletin Board tools can supplement face to face sessions (and for distant students replace face to face tutorials). Through these tools students can increase their interaction with peers and tutor.
- **Application** - using CMC tools, and Web-Based Group-Space(s) students can apply knowledge by collaborating together to construct a resource (an authentic design task).
- **Assessment** - formative feedback can be given via CMC at various levels through a mixture of tutor set tasks/quizzes and peer or tutor comments via CHAT Bulletin Board or e-mail.

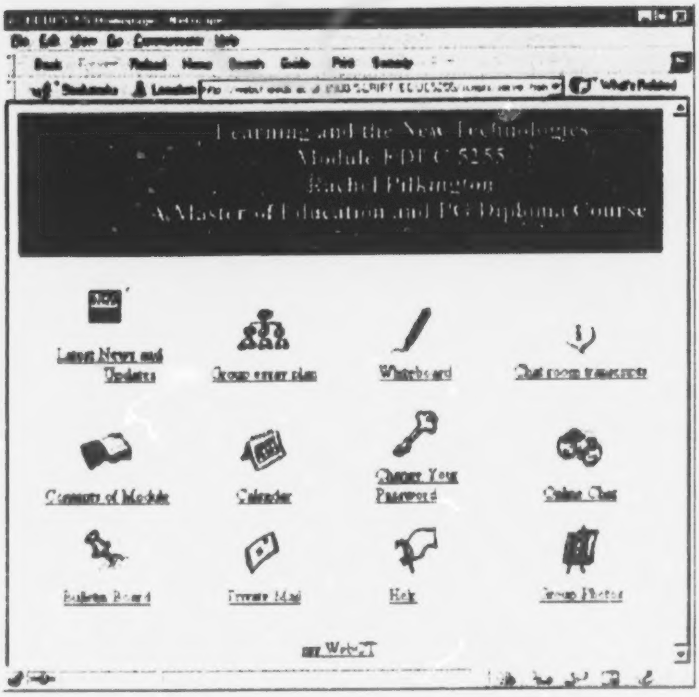

File Edit View Go Communicator Help
Back Forward Reload Home Search Guide Print Security
Bookmarks Location
What's Related
Learning and the New Technologies
Module EDUC 5255
Rachel Pilkington
A Master of Education and PG Diploma Course
Latest News and Updates
Group essay plan
Whiteboard
Chat room transcripts
Contents of Module
Calendar
Change Your Password
Online Chat
Bulletin Board
Private Mail
Help
Group Photos
my WebCT

Figure 1. The WebCT Module Home Page

The IT and Multimedia Course

Based on the above framework, our approach has been to design a Virtual Learning Environment (VLE) using WebCT's CMC and World Wide Web (WWW) Tools (Figure 1 shows the home page with icons through which CHAT, Bulletin Board and Course Content are accessed). The course aimed to develop an understanding of the implications of learning theory for the design of computer-based learning. The evaluated module ran for 12 weeks. It consisted of 22 face to face hours and 11 remote on-line CHAT seminars. On-line course material replaced lectures.

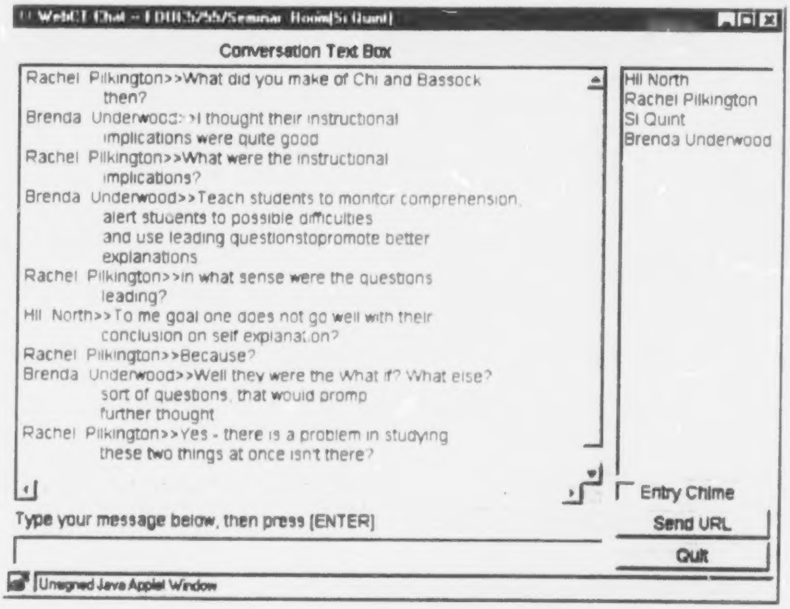
The tutor and 2 demonstrators taught the module and there were 20 registered students (1998). Half the students were part-time and half full-time students. Most (15/20) were teachers with an existing role in teaching ICT. Full-time students were mainly International Students for whom English was a second language but who were resident in Leeds to study. In contrast all part-time students were Home students, but many travelled considerable distances to Leeds.

Lecture notes and Slides were uploaded into WebCT. Lecture Notes were plain text with hyperlinks to glossary definitions. Slides were downloadable as Power Point mixed media presentations. Having the course material on-line enabled *acquisition* to take place at a distance, as a self-paced and individual activity. The emphasis was on giving maximum opportunity for *articulation* and *application* in face to face time.

BEST COPY AVAILABLE

On-Line CHAT Seminars

CHAT seminars were held weekly prior to the face to face session to discuss issues arising out of students' reading of set reading. These evening seminars were tutor-led and content oriented, enabling the tutor to check the understanding of key concepts. Figure 2 illustrates a reconstruction of part of an on-line seminar. (Student names have been changed.)


WebCT Chat – EDUC5255/Seminar Room[Si Quint]
Conversation Text Box
Hil North
Rachel Pilkington
Si Quint
Brenda Underwood
☐ Entry Chime
Send URL
Quit
Type your message below, then press [ENTER]
Unsigned Java Applet Window

Rachel Pilkington>>What did you make of Chi and Bassock then?
Brenda Underwood>>I thought their instructional implications were quite good
Rachel Pilkington>>What were the instructional implications?
Brenda Underwood>>Teach students to monitor comprehension, alert students to possible difficulties and use leading questionstopromote better explanations
Rachel Pilkington>>in what sense were the questions leading?
Hil North>>To me goal one does not go well with their conclusion on self explanation?
Rachel Pilkington>>Because?
Brenda Underwood>>Well they were the What if? What else? sort of questions, that would promp further thought
Rachel Pilkington>>Yes - there is a problem in studying these two things at once isn't there?

Figure 2. Reconstruction of a CHAT dialogue

Practical design issues were made authentic by involving students in collaborative group-work to produce their own web resource. Students worked in small groups of 5 or 6 and chose their group members and the topic of their resource. Within WebCT, private forums (Bulletin Boards) were set up to help group members to collaborate. Students presented their completed resource to the rest of the class and peer-reviewed each other's work on the Bulletin Board. Tutor and demonstrators rated each resource on criteria of management of the collaboration, quality and coherence of the presentation, and relevance and originality of its content. This assessment did not count directly towards students' final grades.

The Evaluation of the Module

The evaluation of the module examines the use of the Virtual Classroom and looked at:

- Student responses on course feedback questionnaires.
- Student participation in on-line CHAT seminars on course reading.
- The quality and the quantity of the discourse produced by students and tutor in the on-line CHAT (See Pilkington, Treasure-Jones & Kneser, 1999 for details of the analysis method).
- Student group-work scores.
- Student written assignment scores. These were final essay assignment grades.

Overall Impressions

Fifteen out of twenty students returned an evaluation questionnaire. Overall, 80% of those giving a response rated the course quality as good to very good. Some students were supportive of the collaborative group-work and wished that assessment had been based on this, others saw problems in working at a distance. Part-timers did not value the on-line CHAT seminars as much as full-time (mainly) International Students.

Participation in CHAT Seminars

From questionnaires, the main reasons for non-participation in the CHAT seminars was difficulty in accessing the CHAT from home. Six students did not participate in the CHAT at all. Of these, five were part-time Home students. These difficulties also affected part-time students' approach to group-work. Group-work scores showed a significant positive correlation with number of weeks they attended the CHAT (Spearman rank correlation $r_s = 0.74$, $N = 20$, $p < 0.01$). This result needs to be treated with caution since each individual in the group is allocated the same grade based on rating the resource of the group. However, it supports the impression (from talking to students) that part-time Home students, frustrated by not having time to manage group-work, adopted a more co-operative than collaborative approach which proved less satisfying and less productive. Similarly, due to difficulty in scheduling time, most Home students showed little use of the CHAT. However, two Home students proved the exception to this rule producing 89% of all Home student's turns. No International student (all full-timers) failed to participate at all. International Students showed a higher level of participation (though turn length was shorter).

Looking at the quality of the participation, the proportion of on-topic Exploratory Dialogue (see Pilkington, Treasure-Jones & Kneser op cit.) was a constant 45% for International and Home students alike. The two dominant Home students produced a higher ratio of this type of talk than other students did (25% of the total number of such moves). However, the tutor accounted for 54% of such moves.

Inclusive Dialogue

The on-line CHAT was a strongly tutor-led discussion. From a total of 9831 words and 664 turns over eight analysed seminars the tutor produced 46% of words and 37% of turns. Three students, 1 full-time International Student and 2 Home students accounted for another 37% of words and 43% of turns between them - leaving just 17% of the word total to the remaining students. This raises the issue of how the CHAT could be made more inclusive.

The Role of Assessment

There was a positive relationship between participation in the CHAT and a good mark in the group-work. However, students who made no use of the on-line CHAT were not less likely to produce a well-written assignment. Since it is the written assignment (and not the group-work mark) that contributes to the final mark, there was no assessment-based incentive to participate in CHAT or group-work.

Issues Raised

Differences in use of the VLE between Home (mainly part-time) and International (all full-time) students emerged. Some students (mainly part-timers) had problems attending the 6-7.00 p.m. time-slot for the evening CHAT. This year, two CHAT seminar slots, a lunchtime slot and an evening slot were provided. This doubled the tutor's seminar hours but also doubled part-timers' participation in seminars. However, difficulties in scheduling meetings (on-line or face to face) continues to affect part-time students' approach to group-work. Full-time students had fewer difficulties in scheduling meetings than part-timers. In the group-work this year, two International Distance Students were able to schedule lunchtime CHAT and Bulletin Board discussions with full-time campus-based students enabling them to collaborate in group-work. This suggests that (at least for part-time students) pressure of time and not the functionality of the tools is a more limiting factor for Collaborative Learning. That two students failed to submit a written assignment and several students required extensions due to work or family problems further suggests that time to study was a more important factor for part-time students.

There was no positive relationship between written assignment mark and participation in CHAT seminars. However, this is probably true only for students able to frame an argument on the topic. Participating in the CHAT may have assisted students starting from a lower level of knowledge or inexperienced in academic argument in English. From the questionnaires, full-time International students tended to value the CHAT more (even those who were silent) and were also more likely to read CHAT transcripts posted the next day. It was difficult for some students to keep up (in real time) with discussion in a second language. The transcripts provided an opportunity for students to check their understanding.

The on-line CHAT seminars on set reading were strongly tutor-led. Based on previous research, CMC tools are poorly used unless the tutor actively facilitates discussion (Rohfeld & Himestra, 1995, p.91). From the dialogue analysis (Pilkington, Treasure-Jones & Kneser, 1999) the tutor interacting with two or three active students was effective in modelling Exploratory Dialogue. However, the analysis revealed a need to encourage more inclusive participation. The value of differing roles for the tutor (explaining, inquiring, encouraging) and the ideal balance between these is now the subject of further work.

Summative assessment might motivate more active participation in CHAT and group-work. Should all students be *required* to take part in such work? If skills such as oral debate design and team working (skills acquired and applied through participation in CHAT and group-work) are valued then the answer is, probably, yes.

All students benefited from some aspects of the Virtual Learning Environment. Part-time and Distance Students benefited from open and flexible access to course material and those who chose to participate in CHAT seminars benefited from not having to travel to meetings. Full-time International students benefited from flexible access to written transcripts of tutorial discussion as well as text-based lectures.

The VLE is being piloted with a small number of Distance Students this year. First impressions are that CHAT and Bulletin Board tools have not fully met these students' need for a sense of presence. One student suggested video-conferencing so that they could really *meet* their fellow students. Kahl & Cropley (1986) suggest Distance Students feel more 'isolated' than face-to-face students and experience lower levels of self-confidence as a result. This can lead them to drop out. Students who commented on this, rated face-to-face contact above CHAT and CHAT above Bulletin Board in giving them a sense of presence.

Conclusions

Problems encountered on this pilot programme suggest the technology is not the most limiting factor in delivering quality education via E-Universities. Students must first have adequate access to the technology, sufficient time to study and sufficient common time to work collaboratively. The work for tutors in attempting to maintain quality whilst adopting distance techniques is increased. However, all students benefited from some aspects of the extra flexibility provided by the VLE. Based on loss of presence and lower participation in seminar and group-work by part-time and Distance Students, concerns about Distance Learning that involves reduced interaction (between students or between teacher and student) appear well founded. Good practice in Distance Learning must involve finding ever better ways to compensate for loss of face to face contact.

Acknowledgements

Work funded by the University of Leeds. Sarah Vaughan (née Brierley) now at King's College London, carried out HTML preparation of the tutor's course materials and much initial design work. Without her work, the on-line course and the evaluation presented here would not have been possible.

References

Barker T. & Pilkington, R. (2000). An Investigation and Design of Networked Learning in Inner-City Leeds. In Proceedings of Networked Learning 2000, Lancaster, 17^{th}-19^{th} April.

Blaye, A., Light, P., Joiner, R., & Sheldon, S. (1991). Collaboration as a facilitator of planning and problem-solving on a computer-based task. British Journal of Developmental Psychology, 9, 471-483.

Littleton, K., & Light, P. (Eds.). (1998). Learning with Computers: Analysing productive interactions. London: Routledge.

Kahl, T.N. & Cropley, A.J. (1986) Face-to-face versus distance learning: psychological consequences and practical implications. Distance education, 7 (1), 38-48.

Mercer, N., & Wegerif, R. (1999). Children's talk and the development of reasoning in the classroom. British Educational Research Journal, 25(1), 95-111.

McCombs, B., L. (1991). Motivation in Lifelong Learning. Educational Psychologist, 26(2), 117-127.

Piaget, J. (1970). Science of education and the psychology of the child (Derek Coltman, Trans.). New York: Orion Press.

Pilkington, R. M., Treasure-Jones, T., & Kneser, C. (1999). Educational CHAT: using Exchange Structure Analysis to investigate communicative roles in CMC seminars. In P. Brna, M. Baker, & K. Stenning (Eds.), Roles of Communicative Interaction in Learning to Model in Mathematics and Science: Proceedings of C-LEMMAS TMR Conference. 15th-19th April, Ajaccio, Corsica: Computer Based Learning Unit, University of Leeds.

Rofeld, R. W., & Hiemestra, R. (1995). Moderating discussions in the electronic classroom. In Z. Berge & M. Collins (Eds.), Computer Mediated Communication and the Online Classroom, Volume 3, Distance Learning. Creskill, New Jersey: Hampton Press.

WebCT (1999). World Wide Web Course Tools. WebCT Educational Technologies Corporation, www.webct.com.

Vygotskii, L. (1978). Mind in Society. Cambridge, Ma: Harvard University Press.

Creating Effective Online Collaborative Educators

Gerard A. Prendergast. Abacus Learning Systems

The early pioneers in online education tried to recreate the world that they were familiar with, the face-to-face classroom or lecture theatre, in cyberspace. There is now a recognition that this approach, to some extent, is limiting. We are starting to recognise that we need to change the way we think and operate, if we are to reap the benefits of Computer Mediated Communication as an educational tool.

When the movie camera was first invented, the early filmmakers filmed plays. It took a few years for them to learn how to exploit the power of the movie camera. If you look at how a film is made today and compare it with the production of a play, you will find that there are some significant differences. Some of the core features in the production of plays and films remain the same. The movie camera permits a great many additional techniques to be exploited. This has resulted, over time, in a whole new way of operating, in order to exploit the medium fully. With the medium of Computer Mediated Communication (CMC) we are still developing educational techniques that will reap the learning benefits that the medium may offer.

The most important element in producing effective 'Online' learning, in my view, is that of the tutor. As Helen Milner and Professor Ian Draffan of the University of Industry point out "University postgraduate departments have realised the benefits of having tutor roles that check up on the progress of all work-based learners. Of course all of this helps retention but we all know that this human encouragement is essential for effective learning." [1] For most learners, the encouragement given by effective tutoring processes determine whether they complete their learning experience successfully. Robin Mason and Martin Weller of the UK Open University maintain, when talking about online tutoring. "However, both for those involved in the staff development process and tutors themselves, there are new sets of skills to learn and working practices to adopt" [2]. Yet very little effort and resources have been committed to produce and enhance the skills of this vital element in this process. There has been too little recognition that educators need any additional skills, in order to maximise their effectiveness when working with CMC.

The Educators

Educators are facing accelerating rates of change. This is making many of them feel very uncomfortable. Much of the change is seen as being externally driven, for non-pedagogical reasons. Often, the educational deliverers are left out of formulating the changes that are then imposed upon them. They are often reluctant to accept anything that has not been explained properly to them and in which they believe they have little or no ownership.

As Barry Jackson stated "Significant changes have occurred in the funding, direction and mission of higher education, all of which have an impact on the teaching of students, and therefore on their learning. Many of the problems facing higher education have arisen from friction between emerging mass education and the elite values which characterize traditional academic organisations. Reduced resources have worsened the ratio of students to staff, which at the same time institutions are diverting resources to the development of learning resource provision to enable distance and open learning." [3]

In order to gain effective change, I believe it is essential that considerable time and effort is spent on preparing educators for the change that is already happening. The radical changes that the developing telematic teaching tools are causing need to be introduced in a way that the educators will understand and accept. Robin Mason believes that " Others characterise the change required as a move away from content to process: ability to communicate, especially across cultures, ability to work in, form and lead teams, and particularly the ability to find, synthesise, and manipulate information." [4] If she is correct, and I believe that she is, getting educators to accept such changes will require a good deal of thought, implementation and planning. "Many institutions are converting lecture notes or other paper-based materials to HTML, for the World Wide Web, but, with little support provided for the student, the gains are minimal. Simply translating material from familiar media into electronic form is rarely productive – and is certainly inadequate for supported distance education, which aims to engage the student in a 'community of learning'. If we hope to improve rather than translate, we must understand the whole teaching and support process through a critical examination of its functions". [5] This is essential, if any real benefit is to be had from CSCL.

In 1997 I ran a workshop at the Online Educa Conference in Berlin, entitled the IMPLEMENTING CMC WORKSHOP. Some 36 educators attended this from some 20 countries. One group looked at the issues that they considered affected educators. I believe some of their findings are worth reproducing here: -

- Traditional older teachers may have difficulty in coping with this method of course delivery. It is hard to change the mentality of some teachers. The workshop participants recounted a number of examples of this. They believed that 'techno fear' was one of the greatest inhibitors here.
- Many organizations failed to plan for realistic staff training, when introducing this medium. This often resulted in people with little or no understanding of the medium being expected to undertake tasks of which they had insufficient knowledge. The hardest part of introducing CSCL was to motivate and train the educators and trainers.
- Enthusiastic Staff members were expected to develop their online skills and design online courses in addition to their already demanding traditional role. Innovators were rewarded with extra work.
- There was recognition that the role of the teacher will change when using CSCL. The teacher will be much more of a mentor than a teacher.. Most experienced CSCL tutors recognise that they needed to undertake lot more of a 'hands off' facilitator role.
- There is the question of added value for the student, when using CSCL. Students received more individual attention from the tutor in online learning.
- Another advantage to an educator who was skilled at running courses, using CSCL, was that they could take part in the delivery of courses, in collaboration with institutions in other parts of the world, without having to waste time and money on travel. This should result in the earning power of skilled CSCL practitioners increasing significantly
- The ability of a University to be able to run an effective course worldwide was already a reality. This meant that traditional 'catchment' areas were no longer a significant factor, in the recruitment of students.

Getting Started

Not many people undertaking mountaineering for the first time would attempt to climb Everest on the first day. Yet many educators acquire some conferencing software and then try and design and run some kind of pilot 'online' course. When their experiment fails, they then rarely blame themselves, often stating that the medium is not very suitable for learning. They do not have any experience of studying, using CSCL. This contrasts shaply with their face-to-face learning experiences, which they subliminally draw upon when conducting a traditional class.

I have found that it is essential to give future educators an extensive opportunity to experience collaborative learning online. Having undertaken intensive, CSCL course of not less than 10 weeks duration, they experience the advantages and disadvantages that their online students are likely to face. This makes them more sympathetic and supportive when they eventually tutor online, themselves. I find it helpful to start such courses with a one-day face-to-face workshop, a form of learning that they are familiar with. The day is structured with the intention of exploring, sharing and reducing the educators' fears. It also permits them to be able to learn how to use the basic functions of the conferencing software with readily available 'hands on' assistance.

Another stratagem is to try and reduce the fear many traditional educators have of computer technology. As Daniel V. Eastmond and Rae W. Rohfeld recognised when they wrote: "Many adult students resist computer technology. Much of the initial training and ongoing support deals with reducing computer anxiety and helps people gain confidence in their ability to use the technology. Once they are successful, students often become "hooked" on computer communications". [6]

Many educators will give a number of reasons as to why they think that CSCL is a 'fad' and not worth pursuing. This is often a mask that hides their fear of the technology involved in the medium, sometimes even from themselves. The aim is to get educators to be able to communicate, study and collaborate with their students using the technology with the minimum of fuss. We want them to be able to view the technology as simply being a tool that allows them to communicate effectively. To this end, they should be given a meaningful group-learning task at an early stage. This task should only require them to be able to log into the conferencing system, read a message, send a message and then log out. This can give the future online educator an intrinsically rewarding learning experience, without requiring them to make a major commitment to learning complex computer programs. A student on a previous course reported " *"When I enrolled on to this Course, I felt I had very little experience of computer technology, however I was soon to realise that some of my fellow students had never switched 'the box' on - my first lesson, if they were willing to try so was I.*

My first task was to discuss my hopes, fears and expectations of the course, how reassuring to discover others felt the same way.

What really fascinated me was how quickly I was became an online Junkie and how my thoughts differed from those of other peoples. By reading fellow students inputs I soon discovered how my own thoughts could be challenged, how I could enlighten my views and broaden my horizons by 'mulling over' other peoples opinions. [7]

This initial face-to-face day also permits the students to start to develop some rapport with their course peers and their tutors. The development of online learning groups is often given a significant boost by some of the collaborative exercises that the students engage in, during their initial face-to-face meeting.

Developing the Online skills.

In our Online Trainers course, the first online module last 3 weeks and is designed to encourage the participants to explore Computer mediated Communication. It is also designed to ensure that non-IT literate participants gain sufficient knowledge to play an active part in the collaborate learning process, during the 10 week online course phase. We encourage participants to adopt the 'little and often' approach. This is connecting to the conferencing system for short periods and as often as possible.

Psychologists maintain that most people can assimilate between 5 and 9 new concepts at any one time. Trying to get participants to learn too many software features early in a course tends to frustrate and demotivate them.

This module also permits participants to experience a 'just in time' non-collaborative type of instructional course, which we use to get them to explore the communications software. We are able to point out the limitation of this type of course in exploiting some of the learning potential of the medium.

During this first 'online module participants are introduced to some small group collaborative exercises. A typical early exercise might be: -
"Task 4
Contributions should be posted in your tutor group areas.

Individually
I want you to think about the educator/ trainer (or other person) who has had the most beneficial influence on your development.
What were the skills/ attitudes and attributes that that person displayed?
What was it about that person that helped improve your motivation to develop?
First: You should post your thoughts to your tutor group area
Then comment on your colleagues' contributions

The summariser should produce a list from these contributions (with reasons where appropriate) that cover the main areas of: -
Skills
Attitude
Attributes
We will revisit your summary later in the course to see what (if anything) a good 'online' tutor might need to add to your list.

I would ask the summariser (Milverton- Group 1, Chris -Group 2,Sarah-Group3 & Tony- Group 4) to try and complete this task by **midnight on Wednesday 26th May"**

The role of the summariser is rotated between the tutor group participants. This is another technique that encourages participation and helps to keep the members of the group actively collaborating.

This period, at the start of course, is designed to cater for student who may have initial teething problems with their computer equipment or their ability to connect to the virtual college. Help is provided, either by a telephone help desk or online, if appropriate. By leaving the more important concepts towards the end of this module, participants with initial technical problems are less likely to miss participating in vital learning stages.

It can be helpful, in a perverse sort of way, for participants to experience some technical problems, as it gives them some first hand experience of the intense frustration that their students will encounter, if they have similar problems.

Participants start to experience the ability of students to form social relationships, using CMC. They often witness 'real process' taken place in these early online discussions. There is something about the medium that seems to encourage more open responses. Maybe it is the lack of the embarrassment factor due to the lack of body language? participants may start to notice that there is a much more even spread of student contributions than usually experienced in a conventional class. Because of the 'built-in' time delay, in this form of asynchronous communication, the more extrovert students are not able to dominate discussions and activities. The students with Theorist or Reflector learning styles (as used in the Honey and Mumford Learning styles theory) contributed much more than they would do in a conventional face-to-face session. Reading about a concept is one thing, discussing what one has read with one's peers it is a much richer learning experience.

Course participants should experience the need for small groups to prevent a common problem that bedevils online training – that of Information Overload. As Anita Pincas states " In order to allow this kind of fruitful collaboration, it is important for the student groups to be quite small, otherwise the number of tasks and messages become too difficult to follow. Just as in f2f contexts, a discussion among more than 8 or 10 people is unlikely to succeed if all want to play a role in it." [8]
From experiments we have conducted, we now advocate groups of 5 or 6. Less than 4 people tend to restrict the interchange of ideas. More than 6 people in a group, we have found that one person tends to become a 'browser' (someone who reads others contributions but fails to contribute to the discussion – also know as a 'lurker'). Larger groups are more difficult to manage and often result in a small number (2/3) of people dominating the discussion, with many of the others then ceasing to access the group discussion.

It is important that educators are given a chance to carry out tasks designed to enhance their skills in communicating with groups, using CMC. Netweaving is the art of being able to link together many points in an online discussion. Some of these will have very tenuous links (typically found in this medium). The course participants undertaking the summarisers' roles enhance this skill. A real advantage is that this type of training permits educators to experiment with their online style of delivery. It gives them the chance to identify differing personal styles and assess how their peer group may receive a particular style.

The intensive exposure, as online students, gives them first hand knowledge of many of the advantages and disadvantages of this medium as a learning tool. Such training should also expose the participants to the various techniques that assist in creating a learning community that motivates collaboration. This would include creating a friendly, social environment, acknowledging the early contributions, giving supportive feedback and fostering the various discussions in the small groups, by asking appropriate questions.

An important additional stimulus, is the concept of the individual online tutorial and online profile. Each participant will experience the reflective online tutorial on two occasions. This gives them personal experience of the power of this very reflective learning tool.
Most educators and trainers deliver some very successful traditional learning experiences, which they have developed over time. They are reluctant to have to start from scratch. Luckily, Computer Supported Collaborative Learning (CSCL) will often utilize material used to support conventional face-to-face teaching, with little or no alteration. CSCL also benefits from the personal touch that most educators and trainers bring to their classes.

Conclusions.

Too often Educators and trainers are asked to develop online skills alone. There is little understanding in many organisations of the knowledge needed to become a successful online tutor. People are being asked to discover the lessons learned by online practitioners since the mid nineteen seventies, from scratch. It is highly unlikely that any single person will be successful in doing so.

Good online training should make educators feel confident to deliver effective online training. It should equip them to know when online training is appropriate, and equally important, when it is not likely to be effective. It should give participants practice in giving online feedback and being able to deal with particular problems associated with CMC, such as information overload and non-participation.

The vital role of the online tutor in establishing successful online delivery needs to be recognised and provision for effective training made. With most governments now developing policies for the provision of online education, this medium is here to stay.

Gerard Prendergast

Training Director
Abacus Learning Systems

Email: learning@abacus-uk.com

February 2000

Reference
[1] Helen Milner and Professor Ian Draffan (2000) Learning Support ---The UFI Proposals – A consultative document (p.3)
[2]Robin Mason and Martin Weller (2000) Factors Affecting Students' Satisfaction On A Web Course (p.11). in Education, Communication, and Information: An International Forum [in Print]
[3]Jackson, Barry (1997) Managing to Help Teachers Change: An Agenda for Academic Managers (p.99) in Facing Up to Radical Changes in Universities and Colleges, Edited by Steve Armstrong, Gail Thompson & Sally Brown (1997) Kogan Page, London , ISBN 0-7494-2129-0
[4] Robin Mason, (1998) Globalising Education Trends and Applications (p.41) Kogan Page, London ISBN 0-7494-2129-0
[5] Marian,Petre, Linda Carswell, Blaine Price and Pete Thomas (p.97-98) in The Knowledge Web, Marc Eisenstadt & Tom Vincent, (1998) Kogan Page, London ISBN0 7494 2726 4 Whilst there was a recognition of the differences, the workshop agreed that both educators and trainers employed many of the same pedagogical strategies with their students.
[6] Daniel V. Eastmond, SUNY Empire State College and Rae W. Rohfeld, Syracuse University (in A report of Syracuse University's computer-facilatated Learning Program in Adult education published on the Interpersonal Computing and technology: An electronic Journal for the 21st Century. ISSN: 1064-4326 July,1993 Volume , Number 3
[7] Gerard Prendergast, (1997) Using Computer_Mediated Communication to Develop Supervisory Skills.(p.36) in Facing Up to Radical Changes in Universities and Colleges, Edited by Steve Armstrong, Gail Thompson & Sally Brown (1997) Kogan Page, London , ISBN 0-7494-2129-0
[8] Anita Pincas, 1996. The Learning Benefits of Well-designed Computer Conferencing, Institute of education, London University

Driving Across Stepping Stones

GILLY SALMON
CENTRE FOR INFORMATION & INNOVATION
OPEN UNIVERSITY BUSINESS SCHOOL
WALTON HALL
MILTON KEYNES
MK7 6AA
G.K.Salmon@open.ac.uk
Web site: http://oubs.open.ac.uk/gilly

Learning online with and through supply chains

Context

Interaction between work (thought of as doing) and learning (mastering new knowledge and skills) and between paid work and leisure is predicated to become much more fluid in the future (Steele 1996). With the advent of online learning, this notion becomes real and the role of training to work in new ways and in new online environments becomes of critical importance. There is broadening acceptance and understanding of learning as a socially mediated and constructed process (Billett 1996) and of knowledge as no longer "fixed"(Hendry 1996). Therefore supporting training and education through work-based networks, especially exploiting the interactive benefits of online working, needs to take account of a much wider variety of factors than learning to use appropriate software.

However, as Schreiber and Berge point out:

"It is a daunting task to maintain an educated, high performance workforce in today's global economy. Increased competition, regulatory bodies, changing technology and process re-engineering conspire to disrupt traditional employee practice and capability."

(Schreiber and Berge 1998) p.xv

At this stage, we do not have clear pathways to translate our knowledge and practice of well-structured distance learning courses (which increasingly include some online working), to the requirements of organisational learning and the individuals within them. I believe we have some of the stepping stones in place- but early projects and innovations are not reporting a smooth ride. Our project, KLASS, is researching and developing concepts and practice in this field.

The KLASS (Knowledge and Learning in Automotive Supply Systems) project

This pilot project is in the automotive component sector, and is being prepared in partnership with four HE/FE institutions and two industry training bodies. The course will provide learning within industry based networks. It has four primary aims:

1) To attract to distance learning individuals and groups that tend to be under-represented within the adult learner population (people working within manufacturing in small and medium enterprises (SMEs), using an appropriate mix of media.

2) To develop motivations for learning among individuals and within the companies that employ them.

3) To identify, through an initial focus on the development of work capabilities, the potential for improvements in performance, thereby contributing to improved employment security in a sector that faces intense economic and technological pressures.

4) To stimulate collaborative learning in supply chains.

The pilot is intended to establish the basis for wider provision in manufacturing and other sectors.

The pilot is an R&D project. It is developing 4 to 6 learning networks, each of which includes some 5 to 7 SMEs. Development of the networks is based upon established buying/supplying relationships between the companies in the networks. The pilot aims to establish how individual learning development and potential for accreditation is shaped by involvement in teams with mixed characteristics, and whether such development can be combined with improvements in the capabilities of companies across supply chain network. The pilot sector faces particularly acute technological and economic pressures.

The course is built around a guided project with integral engineering support as well as learning support. Students in the learning networks will be grouped in teams of up to 8 people within each participating company, drawn from different areas of skill and responsibility. The course provides 220 hours of study. It is undertaken within learning groups that are initially located within companies but that extend, in later stages, to inter-company (network) levels. Establishment of the in-company and inter-company learning groups will be founded upon firm commitments by the companies involved to support the learning objectives and processes. The approach develops from initial, extensive work that been supported by DTI and by the automotive industry.

The course includes a higher than average level of tutorial support for students, through four routes:

i) Preliminary induction, via day schools/workshops and support materials, for key role holders: Change Facilitators and Team Leaders.

ii) Day schools held in the start-up and mid-project stages.

iii) Learning support from highly experienced tutors, which is provided face-to-face, and via synchronous and asynchronous conferencing (FirstClass plus Lyceum).

iv) Support from professional engineers who have extensive experience of the analytical tools and approaches being used in the course and of support for industry based learners.

The course consists of three main modules.

Module One: Working Smarter?
Module Two: Analysing Your Workplace
Module Three: Developing a Learning Network

The overall objective for the assessment strategy is to guide, sustain and support the combination of individual and group learning. It also provides interdependent group and individual responsibilities for assignment submission, and ensures that tutor feedback contributes to the reformulation of task objectives where appropriate and to the next stage of project investigation and trials.

Supporting online learning for supply chains

Since the KLASS programme is currently at implementation, I report here underlying ideas and immediate plans for supporting the learning rather than outcomes. The first stage of implementation is the development of materials and the training of key staff. I focus in this paper on preparation for the more innovative aspects of working online, through asynchronous and synchronous media.

My work has focussed on the building of online learning and working communities of practice. Though content analysis of voluntary use by MBA students and tutors of early online conferencing systems, I developed an understanding of the stages that users go through before becoming competent and comfortable (Salmon 2000).

Stage 1 Gaining Access To and Use of the CMC System

This stage involves the learner getting to know about the availability and the benefits of the system, setting up his or her own system of hardware, software and password, dialling up the system if necessary and getting in to the point that the conferences are available on screen. At the first stage of use, the learner needs information and technical support to get online, and motivation to take the necessary time and effort. High motivation is a prime factor at this stage in encouraging participants to tackle the technical aspects, especially if they are dialling in from remote sites. Access to support needs to be available at the times at which the learner is likely to be struggling to get on-line on his or her own. This problem can be overcome by providing continuing encouragement and support. Where the supply chain online networking is concerned this critical "set up" stage cannot be ignored and will need to be repeated at any point that access or software is changed.

Stage 2 Becoming Familiar with the On-line Environment

A century ago, Durkheim began exploring issues and consequences of socialisation and the implications of shared customs, beliefs and heritage for human behaviour and welfare. He showed that a sense of security and progress depends on a broad agreement both on the ends to be pursued and on the accepted means for attaining them. Every grouping of people develops its own culture - formal and informal rules, norms of behaviour, ways of operating and of sanctioning those who fail to understand or conform. Durkheim used the term anomie to describe the feeling of lack of identification and adjustment with the social environment. An individual cannot easily replace a familiar culture or values with those of a new community - he or she is more likely to selectively adapt or modify features of a new group that seem attractive or useful.

Working online is a new and potentially alien world for many participants (Rowntree 1995). From the first research on Computer Mediated Conferencing (CMC) an influential discovery was the lack of expressive (i.e. non-verbal and visual) behavioural cues (Paulsen 1996). Some users regard this as an inadequacy that can result in a "sense of depersonalisation" (Hiltz 1986) p.100). Others considered the lack of face to face elements to be a freedom, since participants However, such depth and power appears not to be inevitable but to be dependent on the early experiences associated with access and then integration into the virtual community. This stage is critical for the establishment of effective online working for the supply chain community, which already has strong cultural norms and resistance to disruption.

Stage 3 Asking For and Giving Information

After comfort in logging on and feeling part of an online community, users start to appreciate the broad range of information about the topics available to them online. Information flows very freely and the "cost" of responding to a request for information is low. However, the messiness of computer mediated communication is a stark contrast to well structured and logical books, and it makes demands on the participants to find what they "really want". As a result, the learners look to the conference e-moderators (i.e. online facilitators) to provide direction through the mass of data and encouragement to start using the most relevant material. The support skills related to the task focus of the group become important for e-moderators as well as their taking part in the processes of discovery. The interaction occurring at this stage is largely around content and/or sharing of information. For supply chains, this implies constant appropriate structuring of online material and the development of online search skills. In the supply chain context, we are seeking to have well presented and filtered information available, especially in the early stages.

Stage 4 Knowledge construction- group and community interaction

At this stage the participant start to interact with each other, often in highly exposed and participative ways. The act of formulating and writing down an idea or understanding and reading and responding to peers is a collaborative act. Once this begins, it had its own momentum and power and collaborative learning can be seen to happen in very visible and often exciting ways (McConnell 1994). At this stage, very active learning, especially the widening and appreciation of differing perspectives, sharing of information and understanding of application of concepts and theories happens very obviously as conferences unfold and develop.

It is at this point in the development of learning to work on line that embryonic "communities of practice" can be established.

If interactive conferencing and the building of shared practice is desired through online working, the role of the conference e-moderator became important at this stage. The most successful e-moderators demonstrate the high levels of facilitation skills related to group building and maintenance. In the KLASS project, we seek to involve all participants, in whatever role but especially those holding tacit and experiential knowledge. The key is enabling sharing and availability of knowledge through the on and off line environments.

Stage 5 Looking for Additional Benefits

At this stage, participants become responsible for their own learning through the online opportunities and need little support beyond what is already available. Learners often become most helpful as guides to newcomers to the system. This phenomenon was observed from the earliest days of large-scale conferencing (Mason 1990). It is at this point that closed Intranets and conferences can be linked to wider online systems such as the Internet with confidence that users can make appropriate use of the benefits. This is a critical stage for the KLASS project where we seek to tap into existing and established networks and leverage their power and influence through the online environment.

Building an Interactive Online Training Programme

The Principle of Training Online

It is "by experiencing the learning that the meaning is constructed" and the best way to learn or teach online is through the environment itself. (Wild 1996 p.139). Training to work online should take place through the medium itself and this has the advantage of being much lower cost and effective than face to face training alone.

Engaging in reflective and interactive activities, especially those leading to explaining, justifying and evaluating problem solutions are very important to learning processes (Baker and Lund 1997). From the situated learning literature, comes the notion that providing the training in context, i.e. on-line and within a community of practice, enables learning to develop as an intrinsic part of the ongoing activity (Chaiklin and Lave 1993).

Training Structures

The metaphor of "scaffolding" has been applied to notions of tutorial interactions between learners and teacher (Wood, Brunber et al. 1976), linked to Vygotsky's "Zone of Proximal Development". This refers to the gap between what learners can achieve alone and what they can achieve through problem solving under guidance from a teacher or in collaboration with peers (Lave and Wenger 1991). The paradox of interactive media is that they should give greater control to the user, and yet the learner does not know enough about it to be given full control (Laurillard 1995). Scaffolding suggests a way of structuring this interaction and collaboration, starting with "recruitment" of interest, establishing and maintaining an orientation towards task relevant goals, highlighting critical features that might be overlooked, demonstrating how to achieve those goals and helping to control frustration (Wood and Wood 1996). The notion of scaffolding provides an overall framework for training and learning on the KLASS project.

Throughout the design processes, it is essential to stay alert to the notion of training for practice, given that it would be very easy to reduce the experience of preparing for online working to one of teaching software skills. Rasmussen agrees:

"to learn how to use a new media is one matter, to learn how to integrate it into day to day practices is quite another." (Rasmussen, Bang et al. 1991 p. 5).

It is therefore important to build in mechanisms and activities to ensure that users actually **take part** at each level of the online opportunities.

Building in Reflection

Schon pointed out that people influence their everyday practice by having reflective conversations, frame their understanding of a situation in the light of experience, try out actions and then reinterpret or reframe the situation in the light of the consequences of that action (Marsick and Watkins 1992).

This seems to me to be a most accurate description of what occurs "naturally" in supply chains. Through reflection the practitioner can surface and critique understandings that have grown up around a specialised practice and make sense of a situation for him or herself (Schon 1983). To enable this to happen productively in the online environment is extremely important for supply chains since much of the informal knowledge of workers will be generated and transmitted in this way. In that sense the action research embedded in KLASS training will attempt to spot key devices enabling translation from off line reflection to online reflective practice.

Learning online through supply chains- translation to practice

The vision is for a process to "wrap around" the learning system (on and off line) so that every participant is quickly enabled to keep his or her focus on sharing and applying knowledge, and the learning provision becomes as natural as reading a book or listening to a lecture.

Key premises:

- The technology must enable planned and purposeful activities.
- Participants make use of online facilities if there is a very good reason for them to do so, and continue to do so (i.e. no matter how attractive the technology).
- The benefit come from interaction with others (towards learning communities, relevance, group identification), not from huge amounts of online resources– these should be used as stimuli for the interaction between people.
- Working in groups is different online, requires certain (additional) skills of participants and somewhat different facilitation (e-moderating) – these need to be trained for, they don't happen by chance.
- Existing resources and processes can be adapted to the new systems.
- Learning model is one of constructivism and reflective practice.

Implications:

- Support resources are available at the point of need and at the level required for each participant.
- Induction for participants and training for e-moderators takes place in the environment itself.

5 Stages	What?
1. Getting in/Getting Started	
1.1 Technical supporting for logging in and setting up	Documentation, discs and helplines
1.2 Motivation to take part	Provided by overall programme and integration in offline activities
1.3 Welcome by online persona	Individual welcome and support online
2. Getting used/effective/comfortable/ socialised online	
2.1 Ability to send and receive and messages	From prior experience or through local handholding,
2.2 Take part in finding others and interacting in	online induction
2.3 Facilitation to support	Ready-made conferences
	Encourage, support, moderate "social conferences"
3. Giving and Receiving information	
3.1 How to search, find and give relevant and useful information, how to post messages, files and links	Online help, offline training, online training and induction programmes
3.2 Take part in information exchange activities	Meaningful and relevant (small-scale) activities pre and post face to face
3.3 Facilitate activities and task completion on lines with groups	
4. Generate New Knowledge, collaborate	
4.1 Technical support for setting up private small group conferences	Collaborative and co-operative activities
4.2 Leadership of small group	
4.3 Support and provision of resources	
5. External links	
5.1 Support access to Internet	Online databases, libraries and Web links
5.2 Participants ask for relevant resources	
5.3 Point towards available online resources	

The KLASS project's first actions are based on the table above. This includes two days face to face training for key staff and facilitators in May 2000, followed by a 6 week online training programme intended to achieve competence to stage 5 of the model before work commences with the student participants at the end of the summer.

References

Baker, M. and K. Lund, 1997. Promoting reflective interactions in a CSCL environment. *Journal Computer Assisted Learning* 13 (3, September).

Billett, S., 1996. Towards a model of workplace learning; the learning curriculum. *Studies in Continuing Education* 15 (1) :pp. 43-57.

Hendry, G., 1996. Constructivism & Educational Practice. *Australian Journal of Education* 40 (1): pp. 19-45.

Laurillard, D., 1995. Multimedia & the changing experience of the learner. *British Journal of Educational Technology* 26 (3).

Lave, J. and E. Wenger, 1991. *Situated Learning.* Cambridge, Cambridge University Press.

Marsick, V. and K. E. Watkins, 1992. Continuous Learning in the Workplace. *Reflective Practitioner* January (9-12).

Mason, R., 1990. *Home Computing Evaluation: Use of Computing on DT 200, 1989.* Milton Keynes, Open University:. January

McConnell, D., 1994. *Implementing Computer Supported Co-operative Learning.* London, Kogan Page.

Paulsen, M. F., 1996. *The ONline Report on Pedagogical Techniques for Computer-Mediated Communication.* Limsteinveien, NKI: . August

Rasmussen, T., J. Bang and K. Lundby, 1991. A Social Experiment with Electronic Conferencing. *DEOSNEWS* 1 (24).

Rowntree, D., 1995. Teaching & learning online: a correspondence education for the 21st Century? *British Journal of Educational Technology* 26 (3): pp. 205-215.

Salmon, G., 2000. *E-moderating: the key to teaching and learning online.* London, Kogan Page.

Schon, D., 1983. *The Reflective Practitioner: How Professionals Think in Action.* London, Basic Books.

Schreiber, D. A. and Z. L. Berge, (Eds.). 1998. *Distance Training: How innovative organizations are using technology to maximise learning and meet business objectives.* San Francisco, Jossey-Bass.

Steele, L. W., 1996. And the Walls Came Tumbling Down. *Technology in Society* 18 (3): pp. 261-284.

Wild, M., 1996. Technology refusal: Rationalising the failure of student and beginning teachers to use computers. *British Journal of Educational Technology* 27 (2): pp. 134-143.

Wood, D. and H. Wood, 1996. Vygotsky, Tutoring & Learning. *Oxford Review of Education* 22 (1): pp. 5-15.

Wood, D. J., J. S. Brunber and G. Ross, 1976. The role of tutoring in problem solving. *Journal of Child Psychology and Psychiatry* 17 (2) :pp. 89-100.

Developing a system to assure the quality of ICT learning materials to enhance lifelong learning

Dr Sally Sambrook, Dr Susan Geertshuis, David Cheseldine & Rob Willis
University of Wales, Bangor

1 Introduction

This paper reports on a research project that aims to develop a system for identifying 'quality' computer based learning materials. Hence, the research is of an applied nature. Computer based learning materials, those using information and communication technology (ICT), are defined as encompassing both 'online' (web-based) or 'stand alone' (CDROM) products. The purpose of this research is to design a comprehensive yet flexible system providing a series of evaluation tools and information to assist users judge the quality of these products. This project, one of a suite of interrelated projects, focuses on the pedagogical quality of computer based learning materials.

In the UK, the University for Industry (Ufi) has been established to help enhance the competitiveness of British industry by stimulating demand for lifelong learning among businesses and individuals and improving access to relevant high-quality learning resources (DfEE 1998, http://www.ufiltd.co.uk). The Ufi aims to develop the skills of the workforce and encourage lifelong learning by drawing upon developments in education and training technology. However, the success of the University for Industry and the success of computer based training schemes depends on developing learning materials that are engaging and efficient in promoting learning, skills development, knowledge acquisition and understanding. Yet, when selecting an information and communication technology (ICT) based course, it is difficult for a learner or even an experienced trainer to judge pedagogical quality. This research intends to help overcome this barrier to learning.

The aim of this paper is to share our findings based on research carried out to date. The main theme is an examination of three different perspectives on quality – quality as articulated by the Ufi in their Endorsement Criteria for Qualified Suppliers, quality as perceived by subject experts evaluating computer based learning materials, and quality as perceived by a sample of online learners.

In Section 2, we briefly describe the research methods employed. In Section 3, we briefly review the quality literature, which provides a theoretical framework for a critical evaluation of the Ufi Endorsement Criteria. We present findings from the two empirical studies, exploring the perceptions of subject experts and learners, in Section 4 and discuss these findings in Section 5. Finally, in Section 6 we conclude with a critical evaluation of the research and its potential impact on addressing the diversity of quality perspectives related to computer based learning materials.

2 Research Methods

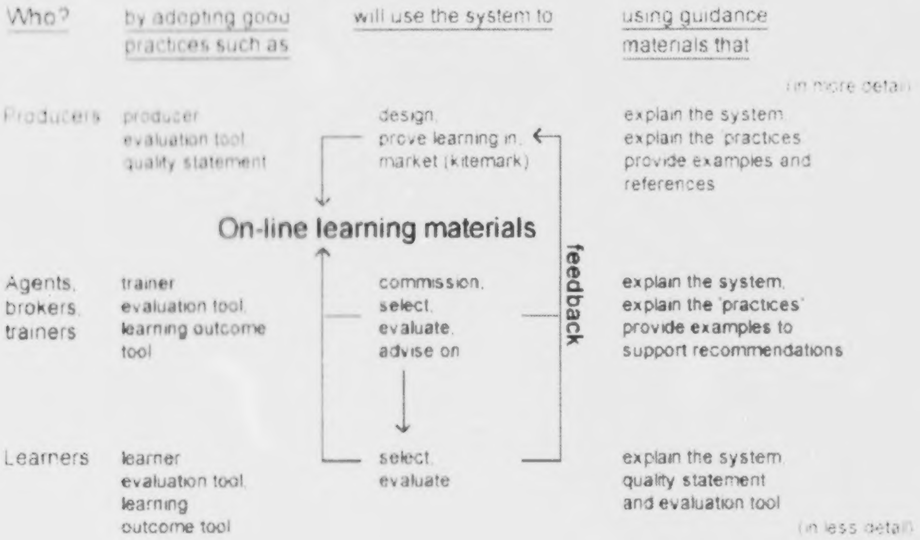
Researchers at the Centre for Learning Development at the University of Wales Bangor (UWB) are involved in a two-year project, funded by the Welsh Assembly, to establish an approach to quality standards for computer based learning materials. Rather than attempt to define absolute quality standards, the team has interpreted this research objective to mean developing a quality assurance system. Thinking of quality, one might consider ISO 9001 or BS5750 quality standards. Already, there exist standards for IT based courses, such as IMS and ERMES (http://www.ermesnet.org), and there are numerous quality criteria sets for educational programmes. However, this research focuses on the quality of learning materials designed to stimulate lifelong learning – that is materials developed for adult learners, who could be learning at home, at work or in one of the Ufi's Learning Centres.

One might ask – why another quality system? What we propose is not another BS5750 or similarly bureaucratic system. Neither do we propose a reductionist system, like the NVQ approach, where a body of knowledge is broken down into its smallest, component parts, somehow missing the elements that create, or link together, the whole (Stewart & Sambrook 1995). In the UK, the government (through Ufi) has set its quality standards for computer based learning materials in the form of the Endorsement Criteria. However, defining quality is a complex and subjective process. Perspectives on quality vary according to whom might be using the computer based learning materials, for what reasons and how. Different users might have different requirements of quality standards. For example, what is quality when one refers to a stand-alone, off the shelf training package and how might this differ from an online, live and potentially networked resource? The quality assurance system being developed by researchers at UWB will address these diverse perspectives. The system, designed for multiple user groups and uses, will enable producers, trainers and learners to understand and use criteria for judging the quality of computer based learning materials. These criteria, taken collectively, form quality standards that can be used in a contingent and flexible manner, to suit the needs of the users. However, initially, the system will focus on ICT 'courses,' that is, those with structured content, which learners can go through individually, perhaps in the form of a distance learning programme, or as part of a group. Constructing a multi-perspective system requires analysing the needs of the diverse stakeholders, and this has been achieved through a multi-paradigmatic approach.

The research design incorporates both quantitative and qualitative methods. The research includes a critical review of literature on pedagogical and quality issues associated with computer based learning, and three empirical studies. The first study involved subject experts and the research team evaluating a sample of computer based courses to identify the characteristics of 'quality' learning materials. The second study focused on the perceptions of a sample of learners (n=20) who were asked to use and evaluate two computer based training packages, to enable the researchers to investigate the relationship between good quality materials and learning outcomes. The aim of the third study is to pilot the online evaluation tools and guidance materials. This will be achieved through a large scale study involving at least 150 trainers and learners in small and medium sized organisations who currently use online learning materials.

The findings from these studies have informed the development of the 'quality assurance system,' intended as a practical tool to enhance lifelong learning. This draft system, illustrated below in Figure 1, is now accessible on the project web site (http://sd68.bangor.ac.uk/draft.html).

Figure 1 Developing a Quality Standards Approach


Who?
by adopting good practices such as
will use the system to
using guidance materials that
(in more detail)
Producers
producer evaluation tool quality statement
design, prove learning in, market (kitemark)
explain the system
explain the 'practices'
provide examples and references
On-line learning materials
feedback
Agents, brokers, trainers
trainer evaluation tool, learning outcome tool
commission, select, evaluate, advise on
explain the system,
explain the 'practices'
provide examples to support recommendations
Learners
learner evaluation tool, learning outcome tool
select, evaluate
explain the system,
quality statement and evaluation tool
(in less detail)

This diagram represents the draft design of what is intended to be a flexible, yet comprehensive, quality assurance system. The system can be used by producers, agents, brokers and trainers and learners. It comprises four online evaluation tools and online guidance materials. However, it is not our intention to describe these in detail here. The purpose of this paper is to explore different perspectives on the quality of computer based learning materials.

In recognition of the different perspectives on quality, the system addresses the needs of the multiple stakeholders in computer based learning, noting their different requirements. The system considers the *inputs* to online learning by devising quality criteria that enable producers to design quality learning products. It addresses the needs of trainers and learners by providing guidance (*outputs*) on how to evaluate and select online learning materials. In addition, the system provides a mechanism for *feedback*, enabling trainers and learners to generate feedback, which producers can use to further improve their products. The key feature of this system is that all components are *online*, establishing a direct link (or *connection*) between the various stakeholders – that is, producers, trainers and learners. The opportunity to provide feedback presents an opportunity to *learn* and *share* learning, thereby creating a virtuous, continuous feedback network. However, the ultimate utility of the system will be tested in our final empirical study.

3 Defining quality

Quality can be defined as fitness for purpose as expected by the relevant stakeholders. More explicitly, quality can be defined as, 'The totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs,' (BSI 1991:2). Identifying the features and characteristics of computer based learning materials has been the focus of this research. However, there are particular problems defining software quality. As Gillies reports, 'Kitchenham (1986b) refers to software quality as 'fitness for needs' and claims quality involves matching expectations. This definition specifically recognizes the two features of a piece of quality software: conformance to its specifications and fitness for its intended purpose,' (Gillies 1992:7). Gillies (1992:12) cites the work of Garvin (1984), who suggests five different views of software quality:

- Transcendent – quality as innate excellence
- Value based – provide what the customer wants at a price they can afford
- Product-based - the economist's view – the higher the quality, the higher the cost
- User-based – fitness for purpose, not technical correctness
- Manufacturing based – conformance to requirements.

Thus, the quality of learning software could be defined quite differently depending upon which perspective is taken. In attempting to define quality learning materials, there is also the need to distinguish between the process and product of learning. As Freeman (1993:60) states, 'the product of training and education is in two distinct parts: process (the experience of learning); product (what you have achieved at the end).' The aim of this research is to develop a system where it is possible to predict that quality learning experiences – as judged against validated criteria – lead to greater learning outcomes, or achievements.

In terms of existing computer based learning materials, 'Quality is highly variable, even though the efforts of bodies such as the British Association for Open Learning and the Open and Distance Learning Quality Council have led to significant improvements. The patchy use of existing products, high costs and low sales volumes are preventing the UK from deriving the maximum benefit from open and distance learning... Ufi has a key role in setting standards of materials design and production,' (A new way of learning: 13).

The University for Industry criteria

The project is funded by the Welsh Assembly, with the objective of preparing for the Ufi in Wales. Therefore, the starting point for the literature review was to determine the origins of the Ufi Endorsement Criteria, which Qualified Suppliers must meet to allow their products to be used in Ufi Learning Centres. An investigation revealed two key sources for the endorsement criteria – the Institute of IT Training (IITT 1998) and Technology for Training (http://www.tft.co.uk/products.design.html) standards. However, little research appears to have been conducted to validate these criteria. The Ufi appear to take a user based perspective on quality as it relates to computer based learning materials. This means ensuring materials are fit for their intended purposes – to stimulate lifelong learning – rather than technical correctness. In addition, the Ufi's perspective could be value based – that is, providing what the customer wants at a price they can afford.

The initial review addressed literature relevant only to the Ufi Endorsement Criteria. However, during this review, two additional and important criteria were identified. These were special needs and transferability. Special needs refers to how the needs of potential learners with various difficulties, such as partial sight, are accommodated in the design of computer based learning materials. This is a significant addition to the Ufi criteria, which, if addressed, can improve and widen access to computer based learning. This again suggests a user based perspective to quality. Transferability refers to the ease with which the learning acquired from computer based learning materials can be transferred from that specific context into other areas of life, such as work, leisure and society. The ability to use the learning acquired from computer based resources will increase its relevance and utility, and further promote this approach to lifelong learning, a key aim of the Ufi. This could relate to a more value added approach to the quality of computer based learning materials.

During the literature review, various sets of criteria were identified (see, for example, IITT 1998, McAteer E & Shaw R (1995), (http://www.geminfo.org/Workbench/quality.html), (http://beth.canberra.edu.au/OldUnits/idhci/flexeval.htm), (http://www.sosig.ac.uk/desire/q1cont.html), (http://www.curriculum.org/eval.htm). The team analysed these to determine similarities and differences in the various criteria sets, identifying consistently mentioned criteria, and constructed an online cross-referencing tool (http://sd68.bangor.ac.uk/crit.html).

4 Empirical studies

This section reports on the two empirical studies conducted to date, and investigates expert and learner perspectives on quality.

The results of the literature review informed the design of two evaluation tools to be used in the empirical studies – the Expert and Learner Evaluation tools. To help make sense of the list, as presented in the Ufi criteria, the researchers grouped the criteria into more meaningful sections, for example, access, navigation, presentation, learning quality and outcomes. In the first two studies, the tools were paper based. However, these are now being developed online.

4.1 Study 1 – Expert evaluation

The first empirical study focused on experts' perceptions of quality. Seven subject experts were asked to comment upon the quality of computer based educational courses with which they were familiar. Analysis of these unprompted comments suggest that the subject experts focused on issues relevant to 'standard' courses, such as content. This might suggest a manufacturing based perspective to quality, evaluating computer based learning materials against their conformance to traditional learning product requirements. The experts failed to explicitly consider issues specific to computer based learning, such as navigation or presentation. Their evaluations were compared to the Ufi criteria. The most frequently mentioned Ufi criteria included: enable learners from diverse backgrounds to relate to the content, provide motivation and take the trainee from the unknown to the new in small logical steps. The least frequently mentioned criteria included: clear method of exiting the course and book marking facility, self-contained, technical specifications and ease of use.

The key finding from Study 1 was that even experienced educators did not explicitly consider the ICT dimensions of quality when evaluating ICT learning materials. This suggests that trainers and educators need considerable guidance and information to assist them evaluate and subsequently select computer based learning materials. Such guidance and information will be provided in the quality assurance system being developed in this research project. Results from this study suggest that the Expert Evaluation tool needs to be detailed, and provide supplementary information when producers or trainers require more knowledge about specific quality criteria.

Study 2 – Learner evaluation

The second empirical study focused on learners' perceptions of quality. Two tools were developed specifically for this study – a Learning Outcome tool and a Learner Evaluation tool. The Learner Evaluation tool enables learners to judge the quality of computer based learning materials against criteria similar to those used in the Expert Evaluation tool, although in less detail. This enables comparisons to be made between experts' and learners' evaluations of a learning resource. In addition, one aim of this research is to determine whether materials evaluated positively by experts result in greater learning outcomes, thus offering a predictive dimension to the quality assurance system.

In this study two courses were evaluated - the first section of an introductory accounting course, focusing on double-entry book-keeping, and a section of an Internet course relating to eCommerce. For each course, the learning outcome was measured by the improvement in the score of the participants in a test after they had completed the course, in comparison with a similar test prior to taking the course. The evaluation questionnaire comprised twenty-five questions, designed to yield quantitative data on the views of the learners regarding the quality of the packages, and a section for learners' comments, designed to gather qualitative data. A sample of learners was also given a semi-structured interview and these interviews were recorded on tape for later transcription.

The results of Study 2 proved to be inconclusive in being able to predict learning outcome from learner and expert evaluations. One of the main limitations of the study was the sample size. Few significant differences in quality judgements were obtained from the quantitative data. However, expert evaluations proved effective in predicting the quality of the learning experience, that is, the process aspects of learning, as measured by the qualitative data. Analysis of this data suggests that learners' judgements focused on presentation and motivation issues. It could also be argued that this study was limited as it used two closed packages, which had no external links. This can be a factor limiting the navigational potential of a particular course. The most striking result of the study was the difference between the quantitative and qualitative evaluations. The findings have enabled the research team to significantly improve the evaluation tools to gather more qualitative data.

5 Discussion

Research findings suggest that learners focus on presentation and learning process issues when making quality judgements about computer based learning materials. Statistical analysis revealed that features such as technical issues and flexibility in navigation are less likely to be associated with quality judgements than are process, planning, transferability and presentation issues. It is possible that the former are a group of criteria that are necessary but not *sufficient* for learning, whereas the latter group are not necessary but when present do *facilitate* learning. The first group could be conceived as potential *barriers* to learning, whilst the second group could be *facilitators* of learning. However, further research is required. The analysis revealed both consistencies between learners and differences between learners. The preliminary system was successful therefore in providing an overview of quality issues and access to individual cases.

6 Summary and conclusions

Perspectives on the quality of computer based learning materials vary according to the diverse range of stakeholders, such as the Ufi, trainers and learners. They each have their own purpose for promoting, evaluating and using computer based learning materials, which influence perspectives on quality. The research studies described in this paper have indicated the different features identified by learners and educators. Therefore, it seems futile to design a quality assurance system that prescribes absolute quality standards. Instead, there is greater utility in constructing a system with multiple uses and user groups, enabling the user to determine whether a particular computer based learning materials meets their quality requirements, basing that decision on well researched and validated quality criteria, and explained in appropriately presented guidance materials.

The aim of this project has been to develop an approach to quality standards for computer based learning materials. This approach takes the form of a quality assurance system, informed by an extensive literature review and two empirical studies. However, the ultimate utility of the system will be tested in our final empirical study. In addition, it is recognised that this system focuses on off the shelf learning materials, and, as such, misses other forms of computer based learning. Further research would be required to address quality issues related to other forms of online learning such as networked learning, where ICT is used to promote connections between learners and tutors and learning communities and interactions between people and online learning materials.

References

BSI (1991) *BS 5750 Quality systems Part 8: Guide to quality management and quality systems elements for services* BSI

Canberra University (circa 1997) *Evaluation criteria for Flexible Learning Systems* (http://beth.canberra.edu.au/OldUnits/idhci/flexeval.htm)

DfEE (1998) *'Pathfinder prospectus'*

Doherty G (1994) (ed) *Developing quality systems in education* London: Routledge

Freeman R (1993) *Quality Assurance in Training and Education: How to Apply BS5750 (ISO 9000) Standards* London: Kogan Page

The Gateway to Educational Materials (GEM) (undated) *Guidelines for Resource Evaluation* (http://www.geminfo.org/Workbench/quality.html)

Gillies A C (1992) *Software Quality: Theory and management* London: Chapman & Hall

Hoyle D (1998) *ISO 9000 Quality Systems Handbook* (3rd edition) Oxford: Butterworth-Heinemann

Ince D (1991) (ed) *Software Quality and Reliability: Tools and Methods* London: Chapman & Hall

IITT (1998) *Technology Based Training Accreditation Programme and Code of Practice for TBT Providers, Standards for TBT Learning Materials, Competencies for Developers of TBT Learning Materials* Institute of IT Training

(Marchmont@exeter.ac.uk) 'The Marchmont Project: Research for the Learning Age'

McAteer E & Shaw R (1995) *The design of multimedia learning programs* The EMASHE Group, University of Glasgow

Minnesota's Virtual University Guidelines for Quality Learning Resources (http://www.mnvu.extension.umn.edu/Other/jorn.html)

OCC (1998) *Guidelines for evaluating learning resources* Ontario Curriculum Clearinghouse (http://www.curriculum.org/eval.htm)

Stewart & Sambrook (1995) 'The role of functional analysis in National Vocational Qualifications: A critical appraisal' *The British Journal of Education and Work* Vol 8, No. 2 pp 93-106

SOSIG (Social Science Information Gateway) (undated) *Quality Selection Criteria for Information Gateways* (http://www.sosig.ac.uk/desire/q1cont.html)

TFT (1999) *Criteria for the Design and Evaluation of TBT materials* (http://www.tft.co.uk/products/design.html)

Ufi (undated) *'A new way of learning: The Ufi Network – Developing the University for Industry Concept'*

University for Industry (undated) (http://www.ufiltd.co.uk)

Individual Approaches to Studying and the Affordances of Interacting with Networked Learning Environments

Keith Smyth and Kathy Buckner
Department of Information Management, Faculty of Arts
Queen Margaret University College, Edinburgh

Abstract

This paper presents the general results of an investigation into networked learning via autonomously accessible, integrated environments which focused on individual approaches to studying, learning outcomes, and subjective descriptions of experience. Learners orientated towards understanding and possessing organised study methods performed most effectively, successfully acting upon the affordances of the environments. The implications are discussed.

Introduction

In recent years the basic concept of affordances that is central to the theory of the perceptual psychologist James Gibson has been adopted by an increasing number of theorists and researchers seeking to understand and explain the potential of educational technology to support and facilitate effective student learning. Gibson defined the term 'affordance' to describe the relationship between an individual and the perceived value of objects in their environment, thus a chair is seen to 'afford' support for sitting down (1979). In the context of educational technology we think of an affordance as being the opportunity for action and extended learner capabilities perceived in the properties of a specific technology or media (Ryder & Wilson, 1996).

A Networked Learning Environment (NLE) is an autonomously accessible hypertext-based resource that combines comprehensive course material with computer-mediated channels for student-student or student-tutor communication and, frequently, multimedia content. Contemporary theory in the broad constructivist tradition claims manifold affordances for students interacting with NLEs and their constituent elements. These affordances are seen to include self-paced and reflective learning (Hiltz, 1994; Grabinger & Dunlap, 1995), the appropriation of conceptually rich knowledge via exploration of conceptually rich hypertexts (Jacobson & Spiro, 1995, Jonassen et al., 1997), authentic representation of information within multiple media formats (CTGV, 1993; Jonassen et al., 1996), and the critical multi-perspective negotiation of understanding that can be fostered by effective asynchronous computer-mediated discussion (Mason, 1994; Yakimovicz & Murphy, 1995). In general terms, the rationale for having students interact with NLEs is the facilitation of an active, learner-centered educational experience that immerses the learner in the personal construction of meaning as opposed to the passive acquisition of knowledge for short-term application.

However, the potential for NLEs to enable active, effective learning can only be fully realised if the learner recognises and acts upon the affordances of the technology. Yet what guarantee do we have that each learner will interact effectively with NLEs under autonomous conditions, fully utilising and benefiting from self-paced study of mediated course material, multimedia representations of information, and the opportunity to participate in asynchronous discussion? Furthermore, what do we understand about the subjective experience of networked learning from the perspective of the learners themselves, or of the factors intrinsic to both the learner and the NLE that influence interaction and subsequent learning outcomes?

Unfortunately current research provides little insight into such issues. Studies of learning involving hypermedia have tended to be highly experimental in nature, based upon controlled interaction with stand-alone environments not autonomous interaction with integrated networked environments. Regarding the nature of the networked learning experience, an over -reliance on anecdotal descriptions of practice by educators at the expense of methodological investigation into student practice, perception and knowledge gained has been recognised (Windschitl, 1998; Ward & Newlands, 1998). The research reported within this paper was conducted to address these shortcomings on a modest scale, and provide an insight into the relationship between individual learners, subjective experience, and the affordances of NLEs.

Method

The research comprised a naturalistic experiment and case study, both of which involved undergraduate information management students (n=30) interacting with NLEs as the sole method of campus-based course delivery. Students were required to autonomously learn the mediated material, participate in on-line discussion, and complete small-scale assignments.

Semi-structured interviews with each student were the primary method of data collection and explored individual accounts of interaction, perceptions of how the NLEs and their constituent elements were intended to and did support learning, and feelings regarding personal suitability to networked learning as a mode of course delivery. To provide further insight into the latter issue and identify any possible relationship with existing learner traits, a short-form version of the Approaches to Studying Inventory (ASI) enabled students to indicate how they undertook learning on their conventional undergraduate courses (Tait et al., 1997). The ASI is grounded within the phenomenographic tradition of educational research (Entwistle & Ramsden, 1983; Marton et al., 1997), and measures whether an individual takes a deep, strategic or surface approach to learning based upon an accumulation of scores on several sub-scales representing the traits generally associated with each specific approach.

To directly assess the potential influence of individual approaches to networked learning upon subsequent learning outcomes, the experimental study facilitated naturalistic conditions through pre-selecting a group of students (n=20) to interact with a networked environment designed to complement a core module yet to be undertaken. This allowed a degree of control over prior knowledge, and ensured the mediated material to be learned was academically relevant to each individual. Students periodically completed short written tests designed to elicit a demonstration of any conceptual knowledge gained, the responses to which were analysed using the SOLO taxonomy (Biggs & Collis, 1984). The SOLO taxonomy enables the classification of learning outcomes at increasingly complex levels of conceptual understanding from a position of meaninglessness to one of abstract thought. Learning outcomes as measured by the SOLO taxonomy have been found to correlate closely with the individual approaches to studying that are measured by the ASI (Van Rossum & Schenk, 1984; Boulton-Lewis, 1998).

Approaches to Studying and Networked Learning

The relationship between individual traits, patterns of interaction and outcomes of learning with educational hypermedia is not fully understood. Whilst some studies report a correlation between these factors (e.g. Rasmussen & Davidson-Shivers, 1998; Chuang, 1999), others report no significant findings regarding learning style and outcome (Fitzgerald & Semaru, 1998). Dillon and Gabbard's (1998) recent meta-analysis further demonstrates our current lack of understanding, but does provide evidence to suggest that individuals who might be considered 'high-ability' or 'independent' learners perform most effectively with hypermedia.
If this is accepted, then it would seem reasonable to assume that those individuals who indicated an orientation towards conceptual understanding or an organised approach to learning as measured via the ASI would prove to be efficient in a networked learning context.

Table 1: ASI Mean Scores with Lowest and Highest Individual Scores

Student n=30	Mean Score	Low Score	High Score
Deep Approach	**14.4**	**10**	**18**
Seeking meaning	14.3	8	18
Relating ideas	13.9	8	20
Use of evidence	15.0	10	18
Strategic Approach	**14.1**	**9**	**18**
Organised studying	13.6	8	19
Time management	13.0	6	19
Alertness to assessment demands	15.6	10	19
Surface Approach	**11.0**	**6**	**15**
Lack of purpose	8.3	4	13
Unrelated memorising	11.4	7	16
Syllabus-boundness	13.4	6	20

Range for scores on sub-scales = 4 to 20. Scores on each approach therefore range from 12 to 60, but have been expressed above as an accumulated average of the related sub-scale scores.

The mean scores on deep, strategic and surface approaches to studying and related sub-scales can be seen in Table 1, which also includes an indication of the variation in individual scores. Because the ASI was designed to assess approaches to learning on conventional courses it is inherently problematic as a direct measure within networked or hypermedia-based learning. However, the findings of this study did indicate a relationship between responses to the ASI at main scale and sub-scale level, and the way in which individual students described their approach to networked learning. The contrasting approaches to networked learning described ran on a continuum from passivity to pro-active interaction with the environment. The former extreme was characterised by disorganised autonomous study methods and an orientation towards rote learning, and the latter by highly organised autonomous study methods and an orientation towards understanding the mediated material. These contrasting positions are encapsulated within the following interview extracts, which are also indicative of the relationship between individual approaches to conventional and networked learning:

> "I do work well alone. It's a way that I like to work and I'm reasonably good at setting deadlines for myself...I tended to do it twice a week, usually at the beginning of a week and then at the end of the week for a shorter time before the test...I tried to pick out the most important things and see what's going to come up because it's a good way to work through it, it puts the points in your head...and if I didn't remember just go back and try and fill in the gaps...If you wanted to, you could just use a search engine to find similar or more [material]."

> "I sort of learnt stuff and memorised it for the test, and then just forgot it again. Just trying to cram it, yeah. I do that for exams...See, that's me. I'm just basic. I don't do any further reading or anything... I just kept reading it again. I'd do it a couple of times before coming in."

The first quotation is from a learner who scored highly on deep and strategic approach scales within the ASI, the second from a surface learner with low 'time management' and 'organised study methods' sub-scale scores. Each is describing how they approached learning the mediated material between the periodic knowledge tests administered during the experimental study. Although these comments are illustrative of extremes in approaches to networked learning, it was generally found that those students who described themselves as independent, self-motivating learners with an orientation towards conceptual understanding interacted most effectively with the NLEs. These individuals studied the mediated material in an organised, reflective manner, and fully utilised constituent elements of the NLEs through purposefully attempting to learn from the supporting multimedia components and regularly accessing asynchronous discussion facilities to read and contribute to on-line debate. In contrast, students who described themselves as disorganised, lacking motivation and with a tendency to 'cram' undertook networked learning in a 'just in time' manner, interacting with the NLEs to access the mediated material immediately prior to task deadlines which reduced the scope for reflection, interaction with multimedia components and participation in asynchronous debate.

What these findings confirm, in accordance with existing research, is that learning style or approach is to some measurable extent a factor in determining the efficiency with which an individual interacts with hypermedia-based environments. Within this study individual approaches to learning as measured by the ASI, and approaches to networked learning as described within the subjective accounts of students, provide a feasible explanation as to why only certain learners interact with networked environments in a manner conducive to the reflective, self-paced learning that asynchronous environments can facilitate (Hiltz, 1994).

Networked Learning Outcomes

Although the influence of learning style upon the effectiveness with which an individual interacts with educational hypermedia environments is accepted, the degree of influence regarding learning outcomes has hitherto been unclear (Chen & Rada, 1996; Dillon & Gabbard, 1998). As regards the findings of this study, the range of answers at increasing levels of conceptual understanding from learners who indicated a deep, strategic and surface approach to studying as measured by the ASI is shown in Table 2. No answers were classified at the extended abstract level of the SOLO taxonomy, signifying full conceptual understanding and an ability to hypothesise, possibly due to the parameters of the experiment.

Table 2: Knowledge Test Answers (SOLO) x Learning Approach and Course Preference

Student n=20	**Level 1**	**Level 2**	**Trans**	**Level 3**	**Trans**	**Level 4**
Deep Approach						
Support understanding *(n=3)*	1.7%	2.8%	0.0%	5.6%	2.8%	2.2%
Transmit information *(n=7)*	5.0%	10.0%	1.7%	15.6%	1.7%	1.1%
Strategic Approach						
Support understanding *(n=3)*	0.6%	1.7%	0.6%	7.2%	1.7%	3.3%
Transmit information *(n=5)*	3.3%	5.6%	0.0%	14.4%	1.7%	0.0%
Surface Approach						
Transmit information *(n=2)*	1.1%	2.8%	0.6%	5.6%	0.0%	0.0%
Total % Answers	11.7%	22.8%	2.8%	48.3%	7.8%	6.7%
Total N Answers	21	41	5	87	14	12

Level 1 = Prestructural response and in the above includes non-meaningful responses; level 2 = unistructural; level 3 = multistructural; level 4 = relational; trans = transitional. Response n=180

Within the context of 'dominant' individual approaches to studying, the results from the knowledge tests seem at first inconclusive. The majority of responses were at the multistructural level, which is the mid-point of conceptual understanding in the SOLO taxonomy, and the number of surface learners too insignificant upon which to base any conclusions regarding the inability of these learners to answer beyond a multistructural level. The nature of these findings is possibly attributable to the potential problem of analysing approaches at main scale level as an individual may, for example, indicate that they approach learning with a focus on understanding (deep) combined with organised methods (strategic).

However, when individual approaches are differentiated by preferences for different types of course and teaching as measured by the ASI the results become more interesting. Of the 14.5% of test answers above the multistructural level at either a transitional or relational level, 10% were given by deep or strategic learners with a preference for courses which support understanding as opposed to transmitting information. This finding is perhaps more significant when considering that the individuals who provided the aforementioned 10% of answers account for only six of the eighteen learners indicating deep or strategic approaches.

The distinction between learners who prefer courses that support understanding as opposed to transmitting information would therefore seem to be a potentially important one. Presumably this is because the factors which contribute to a preference for courses that support understanding as measured via the ASI, including the opportunity for independent thinking and exposure to material that can provide explanations beyond those possible within a lecture, are also those factors central to the demands of learning via asynchronous, integrated NLEs. Evidence for this relationship was also found within learners' subjective accounts of experience. Those students taking what was earlier described as a 'passive' approach to networked learning characterised by disorganised, 'just in time' learning generally expressed a dislike for networked learning because the onus to learn was entirely upon them. Increased control over when to study was considered negative precisely because it did enable the repeated delay of studying, and the lack of lecture-based delivery was lamented because the synchronous nature of lectures prompted attendance and therefore exposure to course content. Students who expressed these views did not feel they learned effectively, which was generally reflected in their knowledge test responses. Learners who approached networked learning 'pro-actively' generally felt suited to this mode of course delivery and believed it to be educationally effective. Test responses consistently indicated higher levels of understanding

Perception and Realisation of Networked Learning Affordances

To recall, an 'affordance' is the opportunity for action perceived in the properties of an educational technology or media (Martin & Ryder, 1996). If approaches to studying and preferences for different modes of course delivery influence the nature and quality of networked learning, then a logical assumption is that these factors might also influence the capacity for an individual to perceive and act upon the affordances inherent within NLEs. This issue is of critical importance, as the degree to which an individual undertakes reflective learning of mediated material, interacts with multimedia, and participates in online discussion will determine how active the networked learning experience becomes, and could subsequently either inhibit or facilitate the realisation of the potential learning outcomes.

In the subjective accounts of experience provided, a relationship between the effectiveness of individual interaction with NLEs and the perception of networked learning affordances was apparent. The following describes how one student interacted with visual multimedia:

> "Basically, there's got to have been a point to it to have been put in, that's what I think, so I keep looking at it until I get the point of why it's there, really. I did look at them all…I did actually study them to see exactly what it was trying to prove to me."

This learner perceived there to be some educational purpose to the presence of the multimedia intended to enhance the textual content of mediated material, and subsequently studied each multimedia component until they reached an understanding of the content. This approach is in contrast to that of another student who believed the multimedia was intended primarily to make the mediated material more visually interesting, and who described only looking or interacting briefly with the multimedia components as they read through the text. Such variations in perception also informed the extent to which individuals interacted with asynchronous discussion facilities, followed links to further reading material on the WWW, or attempted to learn the mediated material in an organised, reflective manner. The primary defining factor enabling successful exploitation of the affordances inherent in autonomous interaction with integrated NLEs was an acute awareness of potential educational benefits.

However, the accurate perception of affordances does not guarantee that potential educational benefits will be realised. Individual approaches to networked learning were found to limit the potential for action, especially in the case of learners who took a 'just-in-time' approach:

> "It's good having all the information there for you prepared in advance. You can look at it whenever you want [and] work at your own speed…I don't know if it worked for me. I left it all to the last minute…I could have done better if I had looked at it more…I'd be too tempted to do other things once I'd got the computer switched on."

This student demonstrated full awareness of the affordances of autonomous learning, but their own approach to learning prevented them from realising the potential benefits of self-paced study. This is illustrative of many similar comments from students who took a 'just-in-time' approach to networked learning - accessing the mediated material immediately prior to a test or work completion deadline, and generally 'cramming' within the limited time available. The fundamental problem with this approach is that it negates the opportunity for reflection, interaction with multimedia components, or participation in asynchronous discussion should the need to articulate a difficulty in understanding some aspect of the mediated material arise. For those 'passive' networked learners who did fully comprehend some or all of the affordances inherent within NLEs, the 'just-in-time' approach was often an overriding factor.

What becomes apparent in considering the relationship between individual learners and their ability to perceive and act upon the affordances of interacting with networked learning environments, and possibly any educational technology, is that it is perhaps misleading to think of affordances as being opportunities for extended learner capability there for all. In contrasting the different ways in which individuals approach networked learning it seems more appropriate to think of affordances as being inherent properties which facilitate enhanced learning potential for some, yet inhibit this for others. Beyond specific approaches to networked learning this could also apply, for example, to a student who understands the value of asynchronous discussion as a medium for reflective debate but is discouraged from contributing due to the idea of their comments being visible on-screen for scrutiny by others.

One possible reason underlying the inconsistency in the perception and realisation of networked learning affordances, and which may also apply to those students who feel their approach to studying is unsuitable to this mode of learning, is the issue of 'learning to learn'. It has been found that as meta-cognitive awareness improves so too does the ability to work effectively in a networked learning context (Hill & Hannafin, 1997). The learners in this study who took an active approach to networked learning generally indicated that they approached conventional learning in a reflective, organised manner. The likelihood is that these students already possessed the necessary meta-cognitive awareness to learn effectively. Those who approached networked learning in a passive manner tended to indicate a similar approach to conventional studying, but generally also expressed a dislike for networked learning due to what it did not afford that a traditional course did – they did not seem to fully appreciate what networked learning offered them that traditional courses do not. Perhaps as students 'learn to learn' in a networked learning context it will become more appropriate to discuss what this mode of study can universally afford all individuals, and the form of active, constructivist learning discussed in the contemporary literature will be more widely observed.

Conclusion

Within the limited parameters of this small-scale study, findings strongly suggest a relationship between individual approaches to learning and effective autonomous interaction with integrated networked environments. Directions for continuing research include further investigation into the nature of individual approaches to networked learning, and into the influence constituent NLE features have upon the mode of interaction with mediated material.

References

Biggs, J.B. , & Collis, K.F. (1982). *Evaluating the quality of learning: The SOLO taxonomy.* New York: Academic Press.

Boulton-Lewis, G. (1998). Applying the SOLO taxonomy to learning in higher education. In B. Dart & G. Boulton-Lewis (Eds.), *Teaching and learning in higher education* (pp. 201-221). ACER Press.

Chen, C. , & Rada, R. (1996). Interacting with hypertext: a meta-analysis of experimental studies. *Human-Computer Interaction, 11*, 125-156.

Chuang, Y. (1999). Teaching in a multimedia computer environment: a study of the effects of learning style, gender and math achievement. *Interactive Multimedia Journal of Computer-Enhanced Learning* [Online]. Available: http://imej.wfu.edu/articles/1999/1/10/index.asp [1999, October 10th].

CTGV (Cognition and Technology Group at Vanderbilt). (1993). Integrated media: toward a theoretical framework for utilizing their potential. *Journal of Special Education Technology, 12(2)*, 71-85.

Dillon, A. , & Gabbard, R. (1998). Hypermedia as an educational technology: a review of the quantitative research literature on learner comprehension, control, and style. *Review of Educational Research, 68*(3), 322-349.

Entwistle, N.J. , & Ramsden, P. (1983). *Understanding student learning*. London: Croom Helm.

Fitzgerald, G.E. , & Semaru, L.P. (1998). The effects of learner differences on usage patterns and learning outcomes with hypermedia case studies. *Journal of Educational Multimedia and Hypermedia, 7*(4), 309-331.

Gibson, J.J. (1979). The ecological approach to visual perception. Boston: Houghton Mifflin.

Grabinger, R.S. , & Dunlap, J.C. (1995). Rich environments for active learning: a definition. *ALT-J, 3*(2), 5-34.

Hill, J.R. , & Hannafin, M.J. (1997). Cognitive strategies and learning from the world wide web. *Educational Technology Research and Development, 4*(77), 37-64.

Hiltz, S.R. (1994). *The virtual classroom: learning without limits via computer networks.* New Jersey: Ablex.

Jacobson, M.J. , & Spiro, R.S. (1995). Hypertext learning environments, cognitive flexibility, and the transfer of complex knowledge: an empirical investigation. *Journal of Educational Computing Research, 12*(4), 301-333.

Jonassen, D.H. , Myers, J.M. , & McKillop, A.M. (1996). From constructivism to constructionism: learning with hypermedia/multimedia rather than from it. In B.G. Wilson (Ed.), *Constructivist learning environments: case studies in instructional design* (pp. 93-106). New Jersey: Educational Technology Publications.

Jonassen, D.H. , Dyer, D. , Peters, K. , Robinson, T. , Harvey, D. , King, M. , & Loughner, P. (1997). Cognitive flexibility hypertexts on the web: engaging learners in meaning making. In B.H. Khan (Ed.), *Web-based instruction* (pp. 119-133). New Jersey: Educational Technology Publications.

Marton, F. , Hounsell, D. , Entwistle, N. (Eds.), (1997). *The experience of learning: implications for teaching and studying in higher education* (2nd ed.). Edinburgh: Scottish Academic Press.

Mason, R. (1994). *Using communications media in open and flexible learning*. London: Kogan Page.

Rasmussen, K.L. , & Davidson-Shivers, G.V. (1998). Hypermedia and learning styles: can performance be influenced. *Journal of Educational Multimedia and Hypermedia, 7*(4), 291-308.

Ryder, M. , & Wilson, B. (1996). Affordances and constraints of the internet for learning and instruction. In M.R. Simonson (Ed.). *18th Annual Proceedings of Selected Research and Development Presentations at the 1996 Convention of the Association for Educational Communications and Technology* (pp. 642-654). Instructional Resource Center, Iowa State University.

Tait, H. , Entwistle, N. , & McCune, V. (1997). ASSIST: a reconceptualisation of the Approaches to Studying Inventory. Paper presented at the 5th International Improving Student Learning Symposium. University of Strathclyde.

Van Rossum, E.J. , & Schenk, S.M. (1984). The relationship between learning conception, study strategy and learning outcome. *British Journal of Educational Psychology, 54*, 73-83.

Ward, M. , & Newlands, D. (1998). Use of the web in undergraduate teaching. *Computers and Education, 31(2)*, 171-184.

Windschitl, M. (1998). The WWW and classroom research: what path should we take. *Educational Researcher, 27*(1), 28-33.

Yakimovicz, A.D. , & Murphy, K.L. (1995). Constructivism and collaboration on the internet: case study of a graduate class experience. *Computers and Education, 24*(3), 203-209.

POSTER PRESENTATION

Alan Staley and Niall Mackenzie
Learning Methods Unit
University of Central England
E-MAIL: alan.staley@uce.ac.uk
Niall.mackenzie@uce.ac.uk

TITLE: Problems at Crumpton
THEME: Staff Development

The 'Problems at Crumpton' project is just one of a number of projects included in the four year Computer Supported Experiential Learning (CSEL) project at the University of Central England. Crumpton is an online spoof university that is having problems because of poorly designed curricula. Academic staff can access the Crumpton website, discover the problems by examining fictitious course documentation and watching a series of short video clips that vividly represent practice at Crumpton University. These clips, which are situated in real world contexts, include a conflict between external examiners, a mutiny in the staff common room, an employer enquiring about the students' skills, inappropriate teaching methods, and a student rebellion. The intention of this problem-based curriculum is to provide the motivational context in a fairly humorous way. Once academic staff have analysed the problems there is a structured study programme to follow, and then a conference in which to collaboratively discuss the issues and suggest tentative solutions. The context for 'Problems at Crumpton' is to provide innovative staff development for University tutors.

The posters and demonstrations will attempt to justify the design rationale of Crumpton based upon a problem-based curriculum (Boud, 1991), motivational theories (Elton, 1996), approaches to learning (Biggs, 1987; Entwistle & Ramsden, 1983), experiential learning (Kolb, 1984; Schon, 1987), and learning by doing (Gibbs, 1985).

In particular, the authors will be promoting the view that online conferencing can be used to reflect upon experience, even if that experience is a virtual one.

Tackling the Issue of Student Motivation Through Educational Technology: An Action Research Model[1]

John Steel* and Graham Holden**

Sheffield Hallam University

* Learning and Teaching Institute, ** School of Science and Mathematics

Introduction

As part of broader research at Sheffield Hallam University which seeks to explore student and tutors perceptions and experiences of networked learning and educational technologies (Steel and Hudson, 2000), this paper presents findings that focus more narrowly on specific issues around the learning and teaching experience of one member of staff and his students. Following an action research model (Kemmis, 1997), this paper explores the process of change within the restructuring of a level one unit in which problems of student attainment and motivation were identified.

This paper explores both the lecturer's understanding of learning technologies with regard to how such technologies might help solve the problems of poor attainment and motivation; and the students own perceptions of how networked learning and the use of educational technologies might contribute to an 'enriched learning experience' for them. The first part of the paper will outline the lecturers expectations, experiences and process of reflection (Schon, 1987) relative to his engagement with networked learning technologies; particularly in relation to the notion of increasing the quality of the student learning experience thus tackling the problem of attendance and retention. The second part of the paper will explore the student perspective of this process, particularly in relation to their perceptions and experiences of networked learning and educational technologies within their course of study, but also within higher education in general.

In providing an insight into the perceptions and experiences of the lecturer and his students within this context, we provide an example of a methodological framework that seeks to be proactive in engaging staff and students in exploring ways to enhance and enrich their learning and teaching experience, thus providing a remedy to the problems noted above. In addition, we offer an account of an innovative use of learning technology with which practitioners may be able to draw from within their own learning and teaching contexts.

Methodology

Action Research

Given that a number of problems were identified with the course unit, it was decided that a fundamental reappraisal of the approach to the unit was necessary. Rather than restructuring the unit ad-hoc, a critically reflective process was engaged both in terms of the way the unit was delivered and in terms of generating student feedback. Such an approach is best summarised by Kemmis when he notes that action research is a "collective self reflective enquiry undertaken by participants in social situations in order to improve the productivity, rationality, & justice of their own social or educational practices and the situations in which practices are carried out." (Kemmis, 1997). The idea of action research is to situate the participant at the core of the research and to engage a constant reflective process.

---

[1] The authors would like to thank Alison Hudson and Ray Thompson for their useful comments and support and all the students on the 'Introduction to Information and Communications Technology' unit for participating in this work.

The Reflective Essay

Ashworth *et. al.* (1996, p. 3) notes that portfolio's have two differing but overlapping purposes: to increase the quality and specificity of the assessment process; and to increase the user's reflection and provide a record of growth and development. The learning journal also has been identified as a key device for engendering students' reflective abilities, whilst at the same time providing work that fits specific assessment criteria and learning outcomes. (Woodward, 1998; O'Rourke, 1998) In keeping with the reflective active philosophy outlined above, coupled with the potential of learning journals and portfolio's as a site of reflection and assessment, it was considered that some form of reflective writing, in the form of a reflective essay, would be useful in terms of providing *active* data on the student's own perceptions and experiences of educational technologies as well as generating feedback on specific technologies used on the unit whilst meeting specific learning outcomes.

Context

This study focussed on a level one unit entitled *Introduction to Information and Computing Technology* (IICT) run within the School of Science and Mathematics' Business and Technology Programme. Two distinct student groups, Business and Technology (degree and HND) and Media Science (degree) making up a total of one hundred and ten studying this unit. A key feature of the unit is that it introduces the concepts behind Information and Communications Technology to a cohort with little or no science background. In addition, for the Business and Technology students, the unit provides the key underpinning for the Technology strand within the course, and provides the rationale behind the study of Technology within what is a Business orientated course. The Media Science course focuses on the communication of scientific ideas through different media so the rationale for the unit is clearer, although the students themselves tend to come from an arts rather than science background.

After running the unit for two years a problem of student retention and attendance was identified, as student 'fall off' had been encountered with regularity particularly in lectures. In addition, poor student attainment resulted in low unit averages (typically around 45%) and an unacceptably high number of referrals (20% for Business and Technology and 35% for Media Science in 1998/99). Clearly the teaching and learning strategy which employed a traditional format of lectures and tutorials, with a long two hour lecture as the main focus for learning, supported by smaller one hour tutorials, was not motivating the students. As is often the case in higher education, a potential conflict was perceived to exist between teaching large numbers of students and the quality of the interaction with the students.

It was decided that a fundamental reappraisal of the units teaching, learning and assessment strategy was necessary. A critically reflective process was adopted both in terms of the way the unit was reviewed, restructured and delivered. The process adopted seeks to engage staff and students in exploring ways to enhance and enrich the learning process. The framework revolves around a dialogue between the lecturer and educational research staff within the University's Learning and Teaching Institute, which is informed by student feedback.

Process

The first stage in this dialogue was to identify the key drivers behind the learning process and the new agenda within Sheffield Hallam University, and Higher Education in general. What emerged was the development of a more flexible mode of delivery of the technology strand with a move towards 'student centred' or 'supported open' learning. These drivers were then placed in the context of what the unit team identified as key issues. The following is an outline of issues and their responses:

To improve *student motivation* by:

- Encouraging participation and a sense of ownership of the learning process i.e. to engage all students in the learning process.

- Encouraging through a structured and supportive learning environment the move from dependent to independent learner.
- Enabling students to learn at their own pace and by encouraging autonomy within the learning process.
- Removing the dependence on traditional styles of delivery.
- Raising awareness and understanding of ICT within the programme - students on these courses should really be using the technology.

To improve *student support* by:

- Improving the accessibility of the subject matter to non-specialist students i.e. those without a strong background in science.
- Enabling the support of a relatively large and diverse student group in terms of background and qualifications.
- Improving the quality of support within existing resource constraints.
- Providing a structured learning environment.

To meet *student demands* by:

- Introducing more flexibility and reducing the constraints of on-campus learning.
- Encouraging the further development of IT skills.

To *benefit the lecturer* by:

- Clarifying and refocusing the subject matter and the materials used.
- Enabling more 'control' over the learning process.
- Moving the focus of staff time away from delivery towards facilitating and supporting the learning process face to face.

As a result of this dialogue between the lecturer and educational development and research staff, the decision was taken to remove a large portion of formal contact time out of the learning and teaching framework, in this instance lectures, and by supplementing these with interaction based around learning technologies. This mixed mode of delivery created 'space' which could be used to enable more meaningful interaction between students and tutors.

For example the authors considered that lectures should be kept as the primary mechanism for the delivery of key concepts and ideas as this provides a focus for the unit and enables regular direction and support to be provided. These lectures were held in a state of the art lecture theatre with high quality projection facilities. The ability to project a networked screen from the student network proved to be a valuable asset in student support and guidance. Moreover, the time taken for lectures was reduced from two hours a week to one hour a week. The 'Introduction to IT' element of the unit was then delivered through 'supported open learning' through a set text and the use of the TopClass web based learning environment. A one hour tutorial each week underpins the learning and supports the concepts delivered in the lectures. The tutorials provide a means of 'small group' face to face contact with a tutor. In addition to the lectures and tutorials, three two hour laboratories support the learning within the unit through hands-on experience of the technology.

Supported Open Learning via TopClass

The Introduction to IT element of the unit involved no formal teaching (reducing the total lecture time by around ten hours in the semester). Teaching was instead provided through the TopClass web based learning environment and course management system. The focus of this part of the unit was around students reading the set text, with the use of weekly use of multiple choice tests within TopClass providing the assessment. Marks were provided instantly on completion of the tests, thus providing instant feedback. In addition to this feedback, TopClass also provided a mechanism for student support through the provision of course materials and relevant information: reading lists, timetables etc.

Skills Development

In previous years a one hour workshop was held each week focussing a different skill. By integrating the introduction of key skills across this unit and the semester two unit Interfaces and by the use of the Key Skills Online package,[2] these workshops were reduced to regular short sessions following the lecture slot.

Assessment Strategy

The assessment load was simplified to enable the introduction of TopClass. The key changes were the removal of group tasks, moving the focus on group work to semester two, replacing it with an individual reflective essay and the use of the TopClass tests to contribute to the unit examination mark.

The Student Response

As noted, the adoption of a reflective essay in this unit was a key element both of the assessment strategy and of engaging students in the action research process. Approximately one hundred and ten essays were marked and then analysed. For the essay, the students were asked to describe the different educational technologies that they were aware of and *how* and *why* these are being used increasingly in higher education. Importantly, students were asked to reflect on their own experiences of educational technologies particularly within the IICT unit. What follows, is an outline, with examples and analysis, of students' responses to the essay questions.

Increasing Instrumentalism/Vocationalism

Emerging from the essays was the explicit recognition by students that the use of educational technologies in themselves provided a meaningful learning experience, despite the content of the technologies used. Often students talked of their engagement with various technologies as 'preparing them for the world of work' or as 'providing skills that they would need in the outside world'. Even those with relatively little experience of technology were pleased that they were getting the opportunity to engage meaningfully with numerous technologies.

> *"As my educational life has progressed, I have come into contact with more advanced forms of educational technology, learning new skills which will enable me to enter full time employment with the confidence in my education that comes from experience."*

Linked to issues around instrumentality is the notion of increasing confidence with technological developments. Many students noted that they had gained in confidence in the use of computers and this was important for their educational and career development.

Flexibility in Learning

The idea of 'flexibility' that the use of educational technologies brings with it was welcomed as students were keen to stress that they benefited greatly from doing the work at their own pace at the time of their choosing.

> *"It puts more emphasis on out of lecture study, and allows the user the freedom to work at their own pace."*
>
> *"...students feel that as though they still have access to the main sufficient notes of the overall topic outside lecture hours at their own convenience."*

---

[2] A web based system to support key skills development.

With added confidence and appropriate support, (see below) notions of flexibility are interwoven with students engaging, at least implicitly, in contemporary educational discourses around notions of independent learning and autonomous learning etc. It was evident from the essays that students' were aware that learning was increasingly their responsibility.

Tutor Support and Feedback

Students' awareness of learning as being self directed was also tempered with an appreciation of the need for a continual dialogue within the learning process. This stress on dialogue was represented very strongly in the texts particularly within the context of the use of the TopClass learning environment, as the tests within TopClass provided instant feedback. The authors feel that this is one of the most important elements of this learning and teaching scenario, as we shall demonstrate below, the students can often feel isolated when the technology is the sole focus of learning.

In addition to support and feedback in the contexts of tests, the awareness and appreciation of mixed mode teaching was applauded by many of the students as a key mode of tutor support.

> *"I was very impressed with the mixture of technology and traditional teaching, as a support mechanism the web based learning added a new dimension to the learning process and made the unit easier to learn."*

This mixed mode teaching involved the tutor providing an appropriate balance of traditional lectures and tutorials as well as online learning. Thus the students did not feel as though they were totally alienated from traditional or more familiar learning scenarios.

Support was not only provided by the tutor as students were keen to employ technologies that engendered collaboration. As such, learning was taking place from within the student body and emerging as a result of collaboration with peers rather than solely being directed by the tutor.

> *"The idea of students sharing advice within the virtual environment is also a good way of encouraging student interaction, as well as helping them find hints about course work and other things that they may be finding difficult."*

Concerns

Although the students responses from the essays were generally positive, their were some concerns that students had, some of which were directed towards the actual role that educational technology has in higher education as well the wider social and cultural dimension of the use of educational technologies. For example issues around 'information overload', and 'there being just too much information out there' was of concern to some students. Also the isolation factor, that being the perception that human contact and the quality of interaction may be placed under threat if the use of educational technology go unchecked.

> *"It abolishes the need for human contact during the course, and the user may feel completely isolated."*

However, it was noted that the balance provided in the unit helped compensate for any undue concerns that the students may have about the threat of diminished face to face contact.

> *"I am generally more familiar with lectures and tutorials and than with on-line learning. I was pleased therefore that lectures were included as part of the course. I feel that through the lectures, the course is given a face and personality. I like to have the opportunity to speak to the tutor in person."*

Conclusions

This paper provides an insight into the perceptions and experiences of a lecturer and his students, through the restructuring of a course unit from a traditional teaching and learning strategy to one adopting a mixed mode of delivery, combining lectures and tutorials with learning technologies. The process of change adopted engages staff and students in exploring ways to enhance and enrich their learning and teaching experience thus providing a remedy to the specific problems of attendance and attainment. By the end of the unit a considerable improvement in attendance was observed (from 50% to 80%) accompanied by a dramatic decrease in the referral rate (to 4% for Business and Technology Students). Student responses to the learning experience, obtained from the reflective essay, were favourable in particular to the adoption of a mixed mode of delivery which was seen to provide an effective support mechanism introducing flexibility without the loss of human contact.

References

Ashworth, P., Bramall, M., Cook, M., Payne, R.: (1996) *Portfolio Assessment in Engineering: An Evaluation from the Students' Perspective*. Internal SHU Paper.

Kemmis, S.: 'Action Research'. In Keeves, P.: *Educational Research, Methodology and Measurement*, (Oxford, Elsevier Science Ltd., 1997) pp. 173-179.

O'Rourke, R.: (1998) 'The Learning Journal: From Chaos to Coherence'. *Assessment and Evaluation in Higher Education*, Vol. 23, No. 4, pp. 403-413.

Schon, D.A.: *The Reflective Practitioner: How Professionals Think in Action*, (London, Temple Smith, 1983).

Steel, J. & Hudson, A.: (2000) *Educational Technology and Learning and Teaching: Pedagogy, Process and Culture*. Under Review.

Thompson, R.: *Student Guide to TopClass*. Internal Sheffield Hallam University publication.

Wilson, D.: (1995) 'Teach the Process, Not the Content'. *Managerial Auditing Journal*, Vol. 10, No.3, pp. 15-18.

Woodward, H.: (1998) 'Reflective Journals and Portfolios: Learning Through Assessment'. *Assessment and Evaluation in Higher Education*, Vol. 23, No. 4, pp. 415-423.

POSTER PRESENTATION

Participants' perceptions of using computer mediated communication (CmC) as part of a distance Master's programme in Educational Technology and English Language Teaching

Joanna Teague
University of Manchester

Abstract:

Throughout 1999 a cohort of English language teachers participated in both collaborative and independent learning activities as part of a fully distance part-time Master's programme in Educational Technology and English Language Teaching. The Master's programme was run by The University of Manchester and the participants were located in different European countries and in Mexico. The distance students and tutors used both real-time (i.e. MOO, IRC, Conferencing) and asynchronous (e.g. email) telecommunications tools to communicate with each other.

Research in this area (Bates 1995, Hiltz 1995, Naidu 1997, Hall 1997, Kay 1989, Harasim 1989, 1995, Nipper 1989, Paulsen 1998) suggests that given worthwhile reasons to participate in collaborative on-line tasks, adult distance learners can benefit from a Constructivist approach to education as they use CmC with their peers and tutors to negotiate, present, discuss and further clarify and develop their understanding of ideas and skills introduced in their distance course.

This poster reports the findings from qualitative research into the distance students' and the principle distance tutor's perceptions of the use of synchronous and asynchronous CmC as part of a Master's programme.

References:

Bates A (1995) The Future of Learning' Paper presented at the Minister's Forum on Adult Learning, Alberta November 30-December 1 [On-line] (accessed 6 April 1998) http://137.82.166.27/paper.html

Garrison R (1997) Computer Conferencing: the post-industrial age of distance education Open Learning 12/2 3-11

Hall D (1997) Computer mediated communication in post-compulsory teacher education Open Learning 12/3 54-57

Harasim L (1989) On-line education: a new domain. In (Eds.), Mason R & Kaye A indweave Harasim L et al (1995) Learning Networks: A field guide to teaching and learning Online The USA: MIT Press

Hiltz S R (1995) The Virtual Classroom New Jersey: Ablex Publishers

Kaye A (1989) 'Computer-mediated communication and distance education' in Mindweave: Communication, Computers and Distance Education (eds) Mason R & Kaye A

Mason R & Kaye A (eds) (1989) Mindweave: Communication, Computers and Distance Education [On-line] (accessed 27 July 1999)
http://www-icdl.open.ac.uk/mindweave/mindweave.html

Naidu D (1997) Collaboative reflective practice: An instructional design architecture for the Internet Distance Education 8/2 257-383

Nipper S (1989) 'Third generation distance learning and computer conferencing. In (Eds.), Mason R & Kaye A Mindweave

Paulsen M (1998) 'The online teaching system' DEOSNEWS 8/7 distributed by DESONEWS@LISTS.PSU.EDU

Staff Development for Networked Distance Education

Sue Tickner
Glasgow University

Background and Context

Glasgow University Initiative in Distance Education (GUIDE) was established three years ago, when there were very few distance courses at the University of Glasgow. Of those, all but one were print-based. At the time of writing there are 8 distance courses or programmes running and a further 23 in various stages of planning and development. Most of the latter make use of networked learning. The teaching staff, development team, support staff and/or administrators of these programmes need new sets of skills and knowledge.

As an institution-wide service set up to support distance education and promote its development, a core part of GUIDE's work is in assisting staff who are new to the concepts, processes and methods involved in setting up and running their distance education programmes. We consequently strive to identify the specific knowledge and skills these staff will need when they embark on the design and development of such a course for the first time. This includes the skills required for networked learning. This information then directs our staff development programmes.

This paper sets out some of the strategies we have applied to staff development for networked distance education. It describes the success and limitations of each approach, examines some possible reasons, and grounds this in the wider context of our philosophy and practice and our understanding of the terms 'networked' and 'networked distance education'. Particular training needs which emerge from our work suggest five broad categories are most commonly needed, these will be examined with examples from our work.

Definitions

The scope of 'Networked Learning' will undoubtedly be discussed elsewhere at this conference, here online distance education requires expansion. Few courses with which we work are delivered exclusively online. Most include some element of face to face meeting, and many make use of multi-media modes of delivery, including print. Increasingly, however the developments are based around a set of resources, activities and communications online. Our understanding of an 'online course' is one where the primary means of communication or delivery is over the networks. This does not necessarily imply, or limit such courses to any of the conditions sometimes associated with networked learning, such as that the content and syllabus are socially constructed, dynamic and unique, and less pre-planned or structured than is usual with other kinds of learning.

Defining 'distance education' is less straightforward, and quickly became an early priority, both for GUIDE and for the staff who sought our help. For resourcing reasons it was important to clarify what we did *not* consider to be distance education, and to whom the staff proposing those projects should go for help. This was also important for political reasons. We enjoy mutually beneficial relationships with other services and could not function effectively without their help and goodwill. The University has a Teaching and Learning Service intended to assist in all aspects of student and staff development and this clearly includes support for innovative, flexible or technology-assisted learning. Part-time developments come under another section, and various services and projects at the University help with different aspects of production and technical development. We neither had the resources nor desire to take on projects falling under others' remits.

We settled on a working definition of distance education as that where 'the bulk of the learning and teaching occurs off-campus'. The extent to which this applies to learners on many traditional undergraduate degree courses is certainly debatable, since most spend a large proportion of their time engaged in self-study. However, this does limit the possibilities with which the inevitable blurring of face-to-face and distance learning & teaching now confronts us. Undoubtedly, the boundaries will blend increasingly as networked learning becomes more prevalent in more 'traditional' courses and for younger learners. Nevertheless, this definition has implications for staff training in networked distance learning, as will be discussed in the final section.

Staff Support - working methods

From the outset we have viewed the close, tailored support we offer from a thorough and personal appreciation of the distinctive features of each development, as central to our philosophy. Each course, programme or project is generally 'taken on' by one of the GUIDE team, matched as far as possible to the needs of the project and the specialist expertise each of us contributes. From that point the staff involved in development are guided through the appropriate stages, prompted, supported and represented when necessary by this close personal contact from one individual, backed by the support of the team - until another's expertise is enlisted.

This is clearly, a resource-intensive approach, but has advantages which are not, in our experience, present in a fixed programme. 'Learning by doing' real world tasks (Seely Brown, 1983) fosters an engagement which does not necessarily occur when learners must fulfil external course requirements (Jones and Cawood, 1998).

Staff Development Activities

Initially we offered a programme of workshops on specific dates at regular intervals, in line with other staff development provision at the University. We devised a series of introductory sessions and incorporated these into the credit-bearing structure then operating for probationary staff. Although apparently of value to those who attended, these met with limited success in terms of providing adequate and timely staff development, whilst releasing our resources for more specific support. Despite the encouraging numbers expressing interest in our courses, the timetabled staff development activities were attended either by a disappointingly small number of staff curious about our existence, some of whom simply needed credits, or by a core group of those with whom we already worked in close cooperation. In reality, many of the latter had little need for 'generic' introductory courses, or were struggling hard to develop different aspects of their programmes at the times our courses became available. Since most of the workshops required attendance at two or more consecutive sessions split over some weeks, most lecturers achieved only a proportion of the training we had designed.

Networked Learning Materials and Support

We have attempted, like others, to create a set of guides and resources to which academics can be pointed for information. Whilst some of these are being used, and at least provide a starting set of references, we have not succeeded in refining these to our satisfaction. Neither do we feel this would provide a comparable or sufficiently comprehensive alternative to one-to-one support through all the stages from conception to delivery. Course teams have limited time and their needs are highly focussed on their specific developments.

In retrospect it seems clear that our own working methods were partly the cause: personal attention to the particular needs of each project is highly valued and initially, each individual or course team requesting our help appeared at a different stage in their development plans. Staff from some courses already running through print-based delivery requested initial awareness raising regarding types of technology and their application. Others might be looking for assistance with anything from proof-reading materials, to finding online assessment software, to writing a funding bid - or simply in deciding whether or not to embark on developing a new course for distance delivery at all. At first there were few projects and a lack of a critical mass.

However, the number of developments increased rapidly. Through a mix of face-to-face support and technology we were essentially providing 'just in time learning' within a growing 'community of practice' (Goodyear & Steeples, 1998), albeit informally and largely by email.

TALiSMAN[i]'s Training Needs Analysis (Tomes and Higgison, 1998) reported that staff used networks frequently (over 80%) to collaborate with colleagues and gather information, and that 80% of staff identified a need for training in networked technologies. Wider use of networked learning, (which became more feasible once the University began supporting conference software), would meet these requirements.

Individual Support within a Networked Community of Practice

In order to address these issues we began a different strategy in 1999, whereby selected sessions are offered to those members of staff on our database at times where maximum benefit might be gained from both GUIDE resources and the academics who need them. We attempt to suit the provision to groups of course teams requiring the training at the times where it will be most beneficial to their planning, development work or delivery. Many elements of these sessions are carried out through networked learning.

At the same time, we have begun to invite groups to specific ongoing and 'one-off' online activities which draw together disparate groups known to be interested in similar issues, and resources for self-study are being developed and constantly reviewed. Our close partnership with development teams allows us to both tailor provision and identify generic issues, which inform the projects in a cumulative, iterative development process, conducted largely in itself through networked learning methods.

The customised approach mixed with targeted networked training does seem to work best, and we see this as a major plus in our philosophy and working methods. Furthermore, it better suits the working methods of those we are aiming to support. Together with the course teams, we work on their own real projects, resulting in the pooled skills of a mixed team. Unlike mandatory training sessions, our networked activities are not viewed as an external intervention but as a local, closed forum for the issues staff are experiencing, rooted in real local examples, restricted to small groups with similar training needs to provide the 'safe environment' in which sharing can occur.

Broad Categories of Training Needs

These various strategies chart our own developing understanding. We have gained experience as our networked body has grown, and succeeded in sufficiently rigorous record-keeping to be approaching a better understanding of the most common categories of training requirements in each development. By focusing on staff needs rather than a comprehensive curriculum, their immediate needs fall into new groupings.

This suggests that there are five broad areas of training requirement common to all staff:

1. course design (including an understanding of how and where networked distance learning might differ from face to face)
2. project planning (development timescales, scheduling discussions and tutor contributions)
3. support systems, including feedback and assessment procedures, communication and interaction online
4. Materials design, with an emphasis on clarity.
5. An appreciation of the role of the online tutor.

The following section broadly describes the knowledge and skills required for networked distance education under each of these headings.

1. Course Design

Designing a distance course might require identifying administrative mechanisms and processes, designing materials, activities, support systems and assessment procedures. Where distance education differs from the usual process is largely a question of emphasis, demanding attention to a wider set of variables. Where learners have regular, face-to-face contact with the course team, their peers, the University services and all the benefits of a campus-based course, small failings in the system might be relatively easily dealt with on an 'ad hoc' basis. When learners are at a distance pre-planning becomes more important.

Networked learning covers a range of learning and teaching methods, from which the tutor needs to be equipped to select. Designing and managing collaborative work requires skills in fostering a supportive environment, making written expectations unambiguous, a need for regular and meaningful feedback online, efficient mechanisms for student support and interaction and an added need for contingency plans where networked learning is used for distance courses. Without experience of either of these forms of teaching there is no reason to expect the majority of staff to have acquired a depth of understanding and ease of application with new skills.

2. Project planning

This is perhaps the area where GUIDE's help is most frequently called upon, and where our liaison with University services, links with external bodies and increasing involvement in policy and direction-setting can ease the path for a hitherto self-contained departmental team. Planning an online distance education course or programme requires an understanding of administration procedures, business planning and/or sources of funding proposals as well as skills in writing them. A considerable amount of experience is required for realistic estimates of, for example, development time, and unless there is a history of project planning it is unreasonable to imagine that academics will come pre-equipped with sufficiently developed skills in scheduling, accounting for dependencies or contingency planning, let alone knowledge of costing mechanisms.

An understanding of how best to schedule and pace events is crucial, and course teams need to predict the ways in which student cohorts might affect 'critical mass' in discussions.

The availability of local services off-campus needs to be understood, as do any limitations.

3. Support systems

While networked learning often aims to increase the learner's responsibility and control, it is nevertheless incumbent upon those offering the experience to provide support and guidance. This is clearly more so when there is minimal face-to-face contact. There are particular considerations which do not necessarily enter into a campus-based network learning course, including the levels of access that can be supposed from a range of ISPs, hardware and software specifications, costs of time online, especial alertness to difficulties arising from disabilities, and non-traditional learner characteristics which might include lack of practice in learning strategies.

4. Materials (and activities) design

Designing materials and activities for an online distance course requires knowledge about how networked learning materials can be delivered remotely and how they might be used, the scope of potential activities and a base from which to justify selections, and an appreciation of the effects of remote delivery.

All of this needs to be learned and applied in context. It is hardly surprising if some academics, having attended a course in web page creation and lacking awareness of alternatives, envisage networked distance materials as lecture notes on the web.

5. An appreciation of the role of the online tutor.

Networked learning is widely believed to work best with a facilitative role for the tutor and a more 'responsible', active engagement for the learner. However, as Laurillard (1993) points out, students cannot simply be left to get on with it; they need clear guidance and support. No more so than when regular attendance, or chance face-to-face meetings do not occur. Using networked learning in distance courses implies a need for skills in the management of online discussion groups; from technical facility with the system (registering students, uploading documents) to a 'feel for' the time to start a new conference area or split an item. The tutor needs to weigh the effects of, and reasons for, intervention for various ends (task/timescale reminders, refocusing discussion, requests for input or feedback, suggestions) Again, where the learning occurs primarily off-campus, the tutor's knowledge and skills in creating the environment, responding to events and managing outcomes are of heightened importance. The online distance education tutor will also need good time management skills. A facility with and perceptiveness to primarily written communications is essential.

Overall, using networked learning for distance education demands a broader understanding of factors related to the institution, wider issues such as costing and management mechanisms and an added sensitivity to the effects of distance. This combination is likely to become more prevalent as networked learning reaches out further beyond the confines of the institution.

Meeting these training requirements

A common, though not invariable, sequence of interactions with a member of staff at the start of a distance development might be as follows:

- Face-to-face meeting to establish aims, the starting point, a broad timescale and resources available/requirements, where we can help. Date for next action/meeting
- Items for action - example materials or course outline notes, basic details and meeting report for confirmation/correction. Frequently references and/or further info, sometimes background reading. Usually through email interactions, one-to-one (or small groups)
- The course team is joined to a mailing list and relevant online discussions, linked to a network of others with similar aims/needs
- Since networked distance course teams are still a fairly small community, individuals are frequently also enlisted in working groups, invited into related projects or wider discussions which result in mutual benefits
- Ongoing assistance and advice throughout development (feedback on draft modules, objective overview and a role in monitoring progress, rapid-response email helpline)
- Reviews, quality checks, collaborative research papers/seminars, evaluations

Mayes (2000) reminds us of four fundamental points about learning: that understanding is built incrementally through the performance of tasks, feedback is essential and individual guidance within a social context is needed at each stage. We concentrate our efforts on supporting the learners' real-world tasks, whilst linking them to self-help networks when they are needed, and grouping similar training requirements in targeted workshops. The small group, closed nature of the networked learning addresses the need for local applicability and institutional context, and minimises initial resistance to staff joining a new community.

In this way, we strive to provide timely, relevant ongoing support related to, and throughout the experience of, all the stages of networked distance education from conception to presentation, evaluation and further development. This is set within a local supportive framework and delivered at times to suit the learner, not the staff developers. This degree of collaboration is only possible through networked learning with the ability, for example, to lurk on tutors' early experiments with conferencing, allowing us to prompt and suggest when help is needed.

Goodyear and Steeples present a helpful discussion of the types of skills and knowledge required for teaching with ICT (1999). The notion of 'craft knowledge' (the depth of knowledge resulting from years of practice) is difficult to both classify and teach. The authors state that to better understand this we need knowledge capturing methods that involve observation. We suggest that ongoing support through networked learning allows us to observe the novice, and that our approach might be viewed as an apprenticeship model; 'on the job training' in the craft from close mentors and the collaborative support of networked communities of practice. Networked learning methods allow for real-world practice within a safety-net of guided support, whilst providing a rich base of practical experience on which to build future expertise.

---

[1] Teaching and Learning in Scottish Metropolitan Area Networks. *http://www.talisman.hw.ac.uk/*

References

Goodyear, P and Steeples, C. (1999) *Teaching with ICT: competencies and craft knowledge.* Paper presented at ALT-C99. Quoted with permission.

Goodyear, P., & Steeples, C. (1998). *Creating shareable representations of practice.* Association for Learning Technology Journal, 6(3)

Jones, C. and Cawood, J. (1998) *The Unreliable Transcript, Contingent Technology and Informal Practice in Asynchronous Learning Networks.* Proceedings of the 1998 International Conference: Networked Lifelong Learning: Innovative Approaches to Education and Training Through the Internet, University of Sheffield.

Laurillard, D. (1993) Rethinking University Teaching: A Framework for the Effective Use of Educational Technology. London: Routledge.

Lave, J., & Wenger, E. (1991). Situated learning: legitimate peripheral participation. Cambridge: Cambridge University Press.

Mayes, T. (2000) *Pedagogy, Lifelong Learning And ICT: A Discussion Paper for the Scottish Forum on Lifelong Learning*, 28 February 2000.

Seely Brown, J. S., (1983) Learning By Doing Revisited for Electronic Learning Environments, 13-32 in White, M., (ed.), The Future of Electronic Learning, Lawrence Erlbaum Associates, Hillsdale, N.J.

Tickner, S (1998) *Securing the Safety Net: Towards a Coherent Strategy for embedding Networked Learning in Academic Staff Development.* Proceedings of the 1998 International Conference: Networked Lifelong Learning: Innovative Approaches to Education and Training Through the Internet, University of Sheffield.

Tomes, N and Higgison, C. (1998) *TALiSMAN Training Needs Analysis Report* © Heriot-Watt University, with funding from SHEFC. *http://www.talisman.hw.ac.uk/tna/*

Networked Learning in Professional Education using Virtual Enterprises

POSTER PRESENTATION

V.C.Vescoukis, S. Retalis and S. Michiotis*
Software Engineering Laboratory
National Technical University of Athens
{V.Vescoukis, retal}@cs.ntua.gr

*Centre for Vocational Training
Sivitanidios School
s.michiotis@sivitanidios.edu.gr

No doubt, the use of new technologies in education has attracted the attention of researchers and education providers for several years. Many cases have been proposed, where the use of new technological tools, especially of network-based ones, can be applied in order to favour the educational process by adding some value. New educational models have been proposed. Tools, frameworks and educational content in electronic form, have been presented and many are still under development using support from the private and public sector, as well as from the EU. Although there are several cases where networked learning has been a paradigm of great success, it cannot be said that the human and capital investments made in the area have been proven "profitable" in terms of improving the quality of at least some categories of education. Perhaps it is the co-incidence of the introduction of networked learning with the restructuring of educational systems that hold the wide adaptation of new methods in education, or perhaps it is simply too early. No matter what the case is, we are still trying to identify areas where networked learning can be applied, which educational models, tools and, last but not least, types of educational software are effective.

For the past three years, we have been working using support from the second framework program for education in Greece, exploiting the possibilities of using networked learning in secondary-level technical education. Early results of this research are and a model and an applied case study for using networked learning methods supplementary to the traditional on-the-job training in an effort to provide a learning environment enriched by educational content produced by the learners themselves. Lately, we have been experimenting with the development of a virtual enterprises model to support technical professional education. A "virtual enterprise" is a simulation of a real world professional activity in a controlled educational environment. Virtual enterprises allow learners to obtain some professional experience without interacting with real world companies, where, as known, several practical problems arise. Learners are involved in a simulation game with real world cases, where they have the opportunity to apply knowledge obtained in classroom and/or by studying educational content.

There are several issues related with the implementation of such an idea. First, a global framework model that would provide the basis for simulating the real world market (i.e creating a "virtual market") as well as for organising the game activities has to be developed. Second, the rules that control the interactivity of learners in various virtual enterprise instances have to be established. The results of these two actions are classes of virtual enterprise models for different kind of enterprises, which, then, have to be presented and most importantly accepted by teachers and staff that will co-ordinate the game. Once this is done, a series of instances of the virtual enterprise models and therefore games that correspond to specific enterprises has to be developed. As can be foreseen, the implementation of a virtual enterprise game cannot be done using classroom, paper and homework. The use of a series of new technology tools, especially of networked learning, is quite essential in the development as well as running of the game.

In this work, we introduce a generic model for designing a virtual enterprise model and for implementing a virtual enterprise game in a technical education institution. We also present our experience with the development of content and tools for running virtual enterprise games in a network environment. So far we have developed the models and the educational content for seven types of virtual enterprises, each one of which can have many instances (that is, many companies of the same kind) operating competitively in a virtual market.

European Trade Union Distance Education: Potential and problems

Steve Walker* & Linda Creanor**

* School of Information Management, Leeds Metropolitan University, The Grange, Beckett Park, Leeds LS6 3QS, UK. Email: s.walker@lmu.ac.uk

**Department of Learning & Educational Development, Glasgow Caledonian University, St Andrew House, 141 West Nile St Glasgow G1 2RN, UK. Email: l.creanor@gcal.ac.uk

Abstract

The growth of transnational corporations, and in Europe the development of a social dimension to the European Union have created greater needs for trade unions to collaborate at European and international levels. Education is a central activity of trade unions as preparation for action in the social and economic fields and the recent and rapid spread of the Internet has created an obvious opportunity to explore the role of computer mediated distance learning. The European Trade Union Distance Education project (ETUDE) is one example of a collaborative approach to networked learning, in the context of a particular community of practice.

Introduction

As trade union organisation acquires a greater transborder dimension in an increasingly globalised world, so the issues associated with cross-border trade union education become increasingly prominent. This paper reflects on the experiences of one project exploring the use of ICTs to support computer-mediated distance learning in trade union bodies at national and European levels. The European Trade Union Distance Education (ETUDE) project, co-ordinated by the European Trade Union College[1] (ETUCO), with the support of the EC, brought together training bodies from affiliated national trade union confederations from Germany, Italy, Sweden and the UK[2] (along with two UK universities and independent evaluators from the UK and Sweden).

---

[1] ETUCO is the education and training body of the European Trades Union Congress (ETUC).

The project objectives fall into three main areas: developing pedagogic approaches to distance and multimedia education appropriate for use in trade union education; developing and implementing a technical infrastructure to support these; and delivering a programme of national and transnational training courses. Alongside their involvement in ETUDE, the four union confederation partners have simultaneously been developing strategic national computer-mediated distance learning programmes, with distinctive foci. Each of these has involved the development of particular approaches to computer-mediated distance learning, with varied objectives and using different technological bases. Although there are substantial differences between national traditions, trade union education generally has an orientation to active learning, drawing on broader democratic and participative trade union traditions (Miller & Stirling, 1997).

This paper examines networked learning aspects of the project. Firstly, it locates the ETUDE project in a model of the development of ICT and education among ETUCO and its affiliated partners. This model highlights two aspects for further discussion - tutor training and organisational - which, it has been asserted, become increasingly significant in the adoption of ICTs in educational organisations. These are reflected on in more detail, before a short discussion highlighting some of the potential, and the problems, for computer-mediated distance learning in European trade union education.

Locating the ETUDE project

The ETUDE project developed out of a strand of education work by European trade union confederations, focusing on education about information and communication technologies (ICT), and their social and economic dimensions. Several of the actors in the project (both organisationally and individually) had previously been involved in an earlier EC-supported project (ETUE-net) which implemented a training programme in the use of the Internet and developed an initial infrastructure for Web-based communications among trade union educators

---

[2] The confederations involved are the German Deutscher Gewerkschaftsbund Bildungswerk (DGB), the Italian Confederazione Italiana Sindicati Lavatori (CISL), the Swedish Landsorganisationen i Sverge (LO-S) and the British Trades Union Congress (TUC).

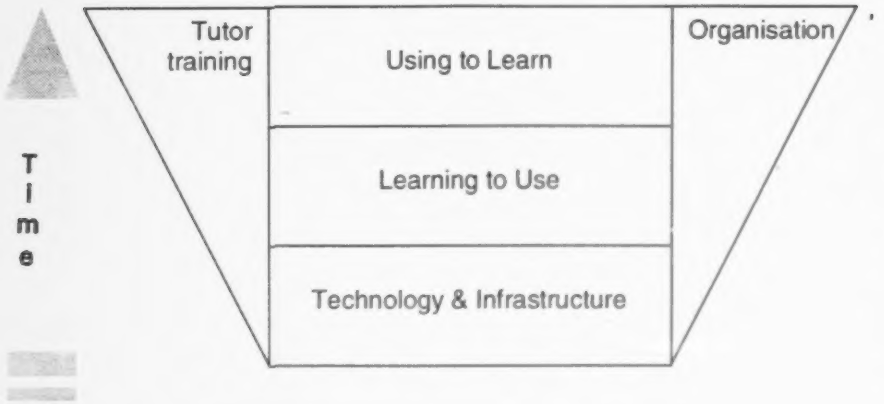


Figure 1: Simple model of ICT Adoption in Educational Organisations

across Europe. In the ETUDE project, partners sought to move on from the earlier training about ICT, to the use of ICT in the organisation and delivery of training: *"ETUDE responds to the need for European trade union education to move from training* ***about*** *telematics to training* ***through*** *telematics."* (ETUDE Project Proposal, p18 emphasis in original).

The spirit of the ETUDE project can be seen in a simple model (Voss, 2000) that has been used to describe the adoption of ICTs in educational organisations as shown in Figure 1. The ETUE-net project[3] addressed infrastucture and '*learning to use*' phases or levels at national and transnational levels. The ETUDE project was designed to move to '*using to learn*' with ICTs. Usefully, Voss's model highlights the growing prominence of issues associated with the training of educators and with organisation and structure, as educational organisations move from acquiring access to ICT infrastucture, through learning how to use the infrastructure, to using the infrastructure for learning.

However, to support the ETUDE project's transnational training, a new infrastructure was implemented which comprised two main components, and which largely superceded the infrastructure developed in the earlier project. Firstly, a conferencing, messaging and electronic mailing list system has been established. This provides access to conferencing facilities via the Internet either using the First Class client or a standard Web browser. Two of the confederation partners already had extensive experience of using First Class to support distance learning programmes; the other two are involved in developing proprietary Web-based conferencing and distance learning facilities. The second major technical area has been the development of a 'Knowledge Pool'. This aims to provide a repository of electronic learning resources that can form the basis for the ongoing development of materials and methods. The Knowledge Pool can be used to store and retrieve materials which may be localised and re-used (or, in some cases re-used directly); materials to support tutors involved in distance learning (for example, guides and checklists) and materials which exemplify particular pedagogic or technological approaches. Alongside the Knowledge Pool, the project tutors are developing a multimedia 'Tutors' Toolkit' of resources.

---

[3] A follow-up project ETUE-net - ETUE-net II is extending the earlier training programme to a wider range of European trade union confederations.

Consequently, despite the shift in emphasis to using ICTs to learn, the ETUDE project has still involved significant aspects of *'learning to use'* the technologies. A slightly revised model, locating the ETUDE and ETUE-net 1 projects is given in Figure 2, which attempts to catch some of the additional infrastructure implementation and 'learning to use' aspects of both projects.

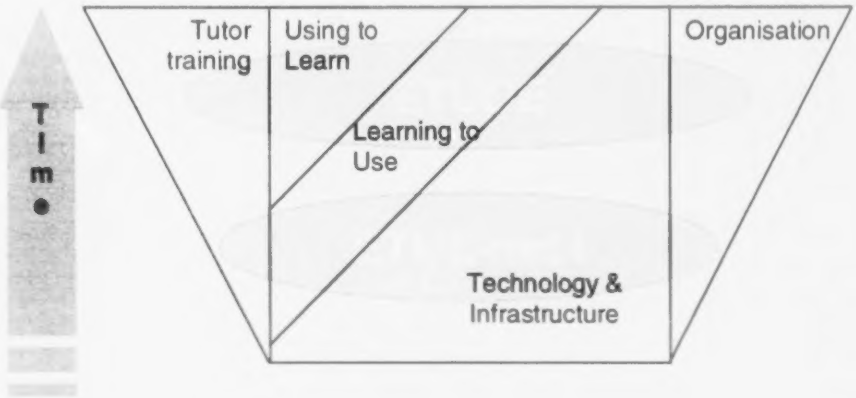


Figure 2: Locating ETUDE in a revised model of ICT adoption

For the remainder of this paper, however, the focus will be on the project's treatment of the growing importance of organisational and training issues, as identified in this model.

BEST COPY AVAILABLE

Training trainers

The project has an overarching objective of developing a transnational European network of trade union educators as a means of exchange and developing innovative approaches to computer-mediated distance learning:

> *"The overall objective of the project is to establish a pan-European network for computer-mediated trade union education. ETUDE aims to build on the collaborative and participative traditions of trade union education and provide an on-line environment supportive to this approach.* ETUDE Project Proposal p.88

The 'Train the Trainers' course was a central example of how the project began to explore these possibilities. Building on the technical base which had been put in place during the first phase of ETUDE, a mixed-mode training course for trade union trainers was developed which aimed to highlight the conceptual framework of a virtual community, while simultaneously providing a realistic scenario for using the technology to learn. The aims of the course were to raise awareness of the pedagogical and practical issues involved in computer-mediated ODL from the perspectives of both tutor and learner, and through a series of individual and group activities, to introduce participants to the skills required to plan, moderate and evaluate a successful online course. Following this, all participants would be responsible for setting up and managing online courses at a national level on various aspects of trade union training.

By restricting the size of the group for this pilot study (12 participants in total from 4 national confederations), course tutors hoped, through stimulating discussion and activity, to encourage the development of a transnational virtual learning community which would be a model for the type of cross-border trade union networks which ETUDE wished to promote. As the effectiveness of the learning experience is closely related to the social context in which it is situated (Mayes, 1995), encouraging identification with this community would be a crucial aim of the course. In order to promote this therefore, inter-confederation groupwork was initiated and activities were designed to encourage collaborative learning.

Structured around a framework of First Class conferences, the sixteen week online course was sandwiched between two face to face sessions, the first of which provided participants with the opportunity to gain further technical skills before going on to use this technology for a specific learning purpose. In the final session participants were encouraged to review the online course and to reflect on their learning experience. Positive aspects cited were:

'learning to use'

- the opportunity to enhance technical and pedagogical skills and thus increase confidence in their own abilities as online tutors.

'using to learn'

- the model itself was seen as useful and transferable, the online tutor support helpful and the resources provided relevant and re-usable.
- even if the overall participation level in conferences was disappointingly low (only 2 out of 12 completed all activities, a further 6 made some contribution, while 4 did not log on at all), a majority of the participants agreed that they had learned vicariously from the contributions of others (Dineen at al, 1999).
- The transnational exchange of ideas and experiences in the F2F sessions was valuable.

More negative aspects included:

- Language - the course was conducted entirely in English, and although all participants had a high level of competence in English, several still felt inhibited from contributing to the online conferences.
- Groupwork - in spite of encouragement from the tutors, the anticipated cross-federation groups did not materialise and activities were amended to individual ones.
- Local support - tight restrictions at a local level caused delays in some participants getting access to the required technology.
- Structure – some participants would have preferred a 'looser' structure to allow for adaptation as the course progressed.
- Timing - scheduling the course over the main holiday period caused problems for many, and there was an overlap for some trainers with their own national courses which had to be given priority.

Although the course had many positive features, it is clear that the anticipated virtual learning community had not materialised, and that the approach to contextual issues such as language and cultural differences had been less than successful. This was characterised by low participation rates and lack of real engagement in the learning process.

One influential factor arose directly from the trade union tradition which encourages a learner-focused, participative approach to education. Instead of creating a fairly tight course structure as was done here in order to stimulate discussion and establish a network of relationships (Jones, 1999), the context suggests that the model should perhaps be re-visited and adapted. Rather than imposing a tutor-led framework, a more inclusive approach which encourages negotiated learning and an accompanying sense of ownership by participants may go some way towards raising motivation levels and encouraging the virtual community. This approach would be significantly different from that which is generally adopted by conventional educational organisations, where accreditation often dictates the necessity for a tight course structure. It would have implications also for the management, organisation and focus of transnational online interaction. As this is crucial not only to the development of European trade union networks, but also to the more general shift towards computer-supported, work-based learning on a global scale, it clearly merits further investigation.

Organisation: networking trade union educators

The ways in which these networks might work to encourage the transfer of ideas and innovation (that is, learning) is not, however, explored in detail in the project proposal and is left largely implicit in the design of the organisational and technical aspects of the project. The organisational spine of the project has been a series of six 'Trainers' Workshops' which brought together the trade union educators involved in both national and transnational course and materials development and implementation (as well as others, including distance learning specialists and technical designers). As noted above, the technical infrastructure has supported the networking aspects of the project through email and conference-based communications channels and the creation of an on-line repository of digital learning resources.

The central importance of social networks in the diffusion of innovation is well established (Rogers, 1995). Granovetter (Granovetter, 1973) has highlighted the role of the individual with 'weak' links into separate, more tightly bound social groups as playing a particularly crucial role in the transmission of ideas from group to group. The importance attributed to channels of communication in the diffusion of innovation has led to the examination of the role of computer-mediated communications networks in facilitating the transmission of ideas and information (e.g. Constant *et al*, 1996; Pickering & King, 1995).

While these models provide some insight into ways in which innovation and practice can be communicated, an alternative way of looking at the transmission of ideas and practice may be that of situated learning. The notion of learning situated in communities of practice has been used to analyse ways in which identity and learning co-develop through a process of participation within a community of practitioners (Lave, 1991). Communities of practice provide the means by which newcomers to a practice learn the skills and practice from old-timers - frequently through relatively informal processes. Communities of practice need not (in general will not) be bound by organisational boundaries and may not be geographically bound. The possibility of transnational communities of practice developing with ICT support has been identified (Hildreth & Kimble, 1999).

The interest here is less on the patterns of participation within the communities than on the interaction between communities, and the ways in which innovation and practice are transferred between them. The interactions at the boundary of communities of practice constitute an area of communication between them and the possibility of transferring skills, knowledge and practice. Taken together, these communities of practice may comprise '*constellations of practice*' - configurations (such as social movements) which themselves are too diffuse to constitute identifiable communities of practice but across which there is some continuity (Wenger, 1998).

Using this approach, a project such as ETUDE may be conceived of as a constellation of practices (Figure 3). Distinct communities of trade union educators might be identified among national partners[4], and of which participants in the project are members. These communities exhibit the characteristics of sustained mutual engagement, joint enterprise and shared repertoire which Wenger argues form the sense of coherence within a community. It is doubtful, however, whether the project partners *in toto* can be said to constitute a 'community of practice'. As noted above, even where face to face and computer-mediated communications events specifically aim to foster joint activities, language differences alone can provide a serious obstacle to sustained mutual

---

[4] These may be nationally, organisationally or politically based, depending on the national trade union education environment.

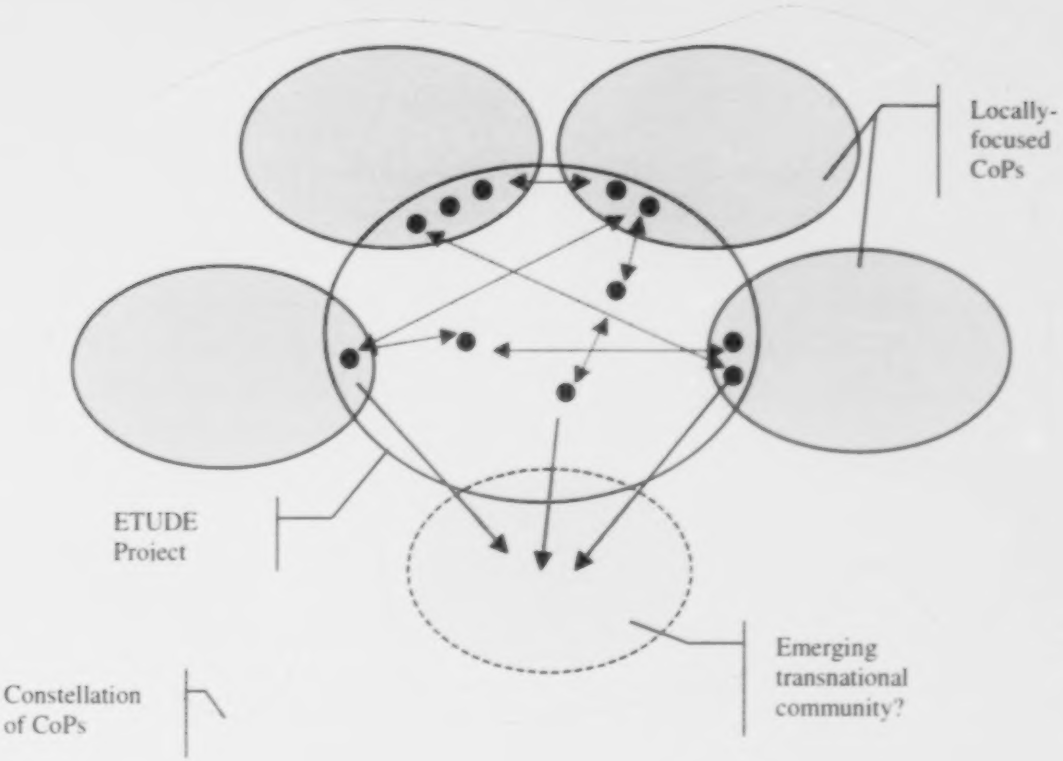

Locally-
focused
CoPs
ETUDE
Project
Emerging
transnational
community?
Constellation
of CoPs

Figure 3 : Configurations of Communities of Practice

engagement. A range of contextual differences between national and organisational settings may also limit the development of shared repertoires and even (given the differences in the wider role of trade unions across European countries) joint enterprise. There is, however, an undeniable continuity of identity across national and organisational boundaries around general ideas of trade unionism, and more specifically trade union education.

The activities within the ETUDE (and similar) projects - both face to face and computer-mediated - may perhaps be seen as providing arena for ongoing, but less intense, interaction between members of these diverse communities[5]. At one level, this provides a mesh of 'weak links' between members of locally-focused communities of practice which provide channels for transferring ideas, skills and practice. (For example, one partner demonstrated and discussed its experiments with using Internet-based videoconferencing in some of its education activities).

---

[5] Overlapping participation in multiple projects also provide for some level of continuity of interaction beyond the life of a single project like ETUDE.

However, the project provides a more intense forum than implied simply by a collection of weak links. One indication of this is in the possible emergence of a new community of those concerned specifically with the development of computer-mediated distance learning events which bring together participants from multiple local/national settings. Those involved actively in this process form a subset of project participants but are concerned with tacking issues of organisational, cultural, technological and linguistic differences which do not occur as issues in national contexts. These issues demand new practice if transnational computer-mediated distance education is to become more significant among trade unions. Such a community would likely coalesce around the organisation of ETUCO - the one partner concerned with transnational education as its central activity - but will also centrally involve educators from national organisations who share this concern to develop a transnational practice. It may also develop to include practitioners from outside the world of trade union educators to include those with specific expertise, for example in the design of computer-mediated learning events or digital learning resources.

Another indication is in the creation of an infrastructure for the ongoing exchange of learning resources. ETUDE has both produced a number of resources which can contribute to the exchange of ideas and practice within and beyond the project itself, and is providing mechanisms for the exchange of existing resources through its 'Knowledge Pool'. This exchange has been at the level of a student guide developed by one partner for use locally being translated into English as a more widely accessible demonstrator of particular practice. It has also involved developing resources within the project, such as training materials and a Tutor Toolkit. These have provided foci for discussion and exchange within the project, as well as acting as a 'boundary object' which can encapsulate elements of practice and knowledge, and transfer them to other communities (Star & Greisemer, 1989).

Discussion

The foregoing is a sketch of the ways in which ideas of learning communities, communities of practice and constellations of practice can help to understand a project like this. It may, however, provide a way of distinguishing different types of interaction, networking and learning and assist with the design of future projects by allowing a closer alignment of face to face events, distance learning events and supporting technologies to the types of networking and exchange intended.

For example, the varying degrees of intensity of communication may benefit from different technological support: intense communications within practices may benefit from the development of more tightly specified communications systems (and practices). Less intense exchanges between members of distinct communities of practice may benefit from rather less tailored communications channels which fit more readily into the daily practice of people working in very distinct communities and for whom the interaction between communities, while desirable, nevertheless is subsidiary to the primary concerns of the 'home' community. Similarly, as noted above, a greater degree of negotiation in, and about, the process of learning may be more appropriate to encouraging the development of more sustainable learning networks.

One particular area where organisational and technical intervention may assist in future projects is in reducing language barriers, perhaps through the use of more intelligent machine translation systems, or through the involvement of human translation (e.g. of summaries of series of conference contributions).

There remains an underlying question, however. To what extent can the difficulties encountered in this project be overcome at the level of project organisation and technology utilisation? Or to put it another way, to what extent are the linguistic, organisational, cultural and other barriers to sustaining learning networks too high to allow for genuinely transnational communities of practice? This is not to deny the value of 'weak link' learning that focuses on the transfer of experience between essentially distinct national communities of practice, or the potential in some settings of creating more durable networks – particularly where the focus of the practice is transnational. It does suggest, however, that there may be value in distinguishing between these two types of learning network and taking account of their attributes in the design both of projects and technologies.

References

Constant, D., Sproull, L. & Kiesler, S. (1996) "The Kindness of Strangers: The Usefulness of Electronic Weak Ties for Technical Advice", Organization Science 7(2) pp. 119-135

Dineen F., Mayes J.T., Lee J. (1999), 'Vicarious Learning through Capturing Task-Directed Discussions', ALT-J, 7 (3), pp33-43

Granovetter, M. (1973) "The Strength of Weak Ties", American Journal of Sociology, 78 pp. 1360-1380

Hildreth, P. & Kimble, C. (1999), *'Communities of Practice in the Distributed International Environment'*, paper presented to workshop Design for Collaboration: Communities constructing technology, York, UK March 1999

Jones, C., Asensio, M., Goodyear, P. (1999), *Networked Learning in Higher Education: Practitioners' Perspectives.* Paper presented at ALT-C 99, 21-23 Sep, Bristol, UK

Lave, J. (1991) *'Situating Learning in Communities of Practice'*, in Resnick, L., Levine, J. & Teasley, S. (eds) Perspectives on Socially Shared Cognition, APA, Washington DC, USA

Mayes, J.T. (1995), Learning Technology and Groundhog Day: Hypermedia at Work. In Strang w., Simpson V. and Slater D. (eds), Practice and Theory in Higher Education, pp21-37, University of Kent Press, Canterbury.

Miller, D. & Stirling, J. (1997) *Trade Union Education in Europe: A Pilot Study*, University of Northumbria Research paper commissioned by the European Trade Union College and the Hans Böckler Stiftung, Düsseldorf

Pickering, J.M. & King, J.L. (1995), *'Hardwiring Weak Ties: Interorganizational Computer-mediated Communication, Occupational Communities, and Organizational Change'* in Organization Science Vol. 6, No. 4, pp. 479-486

Rogers, E. (1995) Diffusion of Innovation (4th Edition), Free Press, New York

Star, S.L. & Greisemer J. (1989) *Institutional ecology, "translations", and boundary objects: amateur and professionals in Berkeley's museum of vertebrate zoology*, 1907-1939, Social Studies of Science 19, Sage, London pp. 387-420

Voss, L. (2000) *European network of Innovative Schools*, presentation to Euro Education, February 8-10th Aalborg, Denmark

Wenger, E. (1998) Communities of Practice: Learning, Meaning and Identity, Cambridge University Press

Networked Communication and the Collaborative Development of Written Expression at Key Stage Three

S. Aisha Walker and Rachel M. Pilkington
E-mail:aisha@cbl.leeds.ac.uk or Rachel@cbl.leeds.ac.uk

Introduction

In Britain's inner cities, there are many children with a 'literacy deficit' whose educational potential may not be fulfilled because they lack skills for communication through written language. Previous research suggests that computer-mediated communication (CMC) may encourage the development of literacy skills by increasing motivation and enhancing inclusive participation in text-based discussion. A study was carried out to explore the effect of text-based CMC on the literacy skills of a group of key-stage three children. .The results showed improvements in fluency, confidence, argumentation and awareness of audience.

Background

Chapeltown and Harehills Assisted Learning Computer School (CHALCS) is an out of school project in one of the poorest areas of Leeds: a district with a multi-ethnic population and high levels of unemployment. Reflecting the composition of the community, most CHALCS pupils are of African-Caribbean or South Asian ethnic origin and, for many of the students, English is an additional language [Ravenscroft and Hartley, 1998].

CHALCS courses include a literacy programme which achieves good results with younger children but is not meeting the needs of the older age group. Therefore, the literacy team suggested that a new programme be developed to target children in the 13-15 pre-GCSE group. These children do not have the basic skills or confidence from which to develop their abilities to write extended texts of the kind required by the National Curriculum. Thus, the programme needs to facilitate the development of these skills, and enhance the confidence of the children in order to provide a basis for further writing work.

The new programme will incorporate a range of computer tools including synchronous online chat. A small-scale study was carried out in order to establish the extent to which online chat would facilitate the development of children's writing. It was hypothesised that the children involved in the study would show

- an increased fluency and confidence in writing;
- an increased ability to express their written opinions clearly and articulately;
- a move from knowledge telling to knowledge transformation;
- an increased ability to develop and support arguments;
- an enhanced awareness of audience;
- a greater willingness to listen to and interact with others.

Studies on the use of computers in writing have demonstrated that the technology can reduce writing apprehension and increase fluency [for example: Neu and Scarcella 1990, Pennington 1996, Phinney 1990, Warschauer 1999]. Pennington [1996] identified four stages of improvement through computer-assisted writing: "writing easier", "writing more", "writing differently" and "writing better". Most of the studies into computers and writing were carried out using word processing but some, such as Sullivan and Pratt [1996] Beauvois [1997] and Warschauer [1999] used synchronous CMC.

Writing involves a process of changing knowledge into text. Flower and Hayes [1980] see this as a problem involving many components: audience expectations, genre conventions and so on and argue that one of the characteristics of a mature writer is the ability to solve this problem. According to Bereiter and Scardamalia [1987], as writers develop maturity they must move from a process of 'knowledge telling' to one of 'knowledge transformation'. 'Knowledge telling' may be defined as the simple disgorging of everything a writer knows whereas 'knowledge transformation' is the process of converting knowledge into a text which is appropriate to the context and audience. The immediate reader responses provided by synchronous CMC should assist children to make this move from knowledge telling to knowledge transformation.

Collaborating, discussing and arguing with other people can scaffold the development of reasoning and writing. Kuhn et al found that, after engagement in dyadic discussion, people were able to support their ideas with more and better arguments. Burnett [1993] found collaboration scaffolded writing most effectively when the authors engaged in 'substantive conflict' rather than consensus. Mercer et al [1999] came to a similar view; they defined children's talk as 'exploratory', 'disputational' or 'cumulative' and concluded that 'exploratory talk' (involving active discussion of ideas) improved children's reasoning skills. A CMC environment provides a rich setting for discussion and conflict to occur and should thus lead to an improvement in the children's argumentation and reasoning skills.

One of the claims made for CMC is that it enables people to participate more equally in a discussion [Sullivan and Pratt 1996, Warschauer 1996]. In particular, Warschauer [1996] compared face to face and electronic discussion with racially mixed groups and found that ethnicity was a factor in limiting a student's face-to-face participation but did not restrict CMC engagement. In a mixed group such as a CHALCS class, this democratisation could be significant. However, Robertson et al [1999] noted that in CMC, people can "form cliques without appearing rude" [232] - although in Robertson's study the children were anonymous.

Method

Each session was led by a tutor from the CHALCS literacy team. On several occasions, especially in the early weeks of the study, the researcher was also present. The first part of the session (usually one hour but occasionally longer) was given to CMC using the 'chat' feature of WebCT, a virtual learning environment. The remainder of the class time was used for activities not related to the study (for example, SATs practice).

Results

All of the chat sessions were logged. Three early sessions and three later sessions were analysed to determine average turn length, number of turns on topic and number of turns containing reasons (indicated by causal discourse markers such as 'because and so). The results are shown in Table 1.

As Table 1 shows, the children's writing increased in length and complexity, indicating an increase in overall fluency and confidence. In the early sessions, there were more turns in a discussion but the turns were significantly shorter than in later weeks. Furthermore, the longest turn in the later sessions is much longer than in earlier classes. As Examples 1 and 2 show, the longest single turn on 30/4 is shorter and of poorer quality than the longest turn on 9/7. Moreover, on 30/4 only twenty-six turns (6.9%) were more than 10 words long including only two (0.5%) more than 20 words in length. On 9/7, on the other hand, forty-three turns (23%) contained more than 10 words with twenty of these (10.6%) being more than 20 words long.

	Topic	Words	Turns	Mean turn length	Turns on topic	Turns with reasons
30/4	Aliens	2021	373	5.41	21.4%	1.07%
7/5	Pop Music	1880	323	5.82	44%	4.02%
14/5	TV	831	219	3.79	78%	3.1%
18/6	Is School Fair?	1127	76	14.82	78.9%	22.3%
2/7	Women in Sport	883	75	11.77	93.3%	21.3%
9/7	Family Roles	1549	187	8.28	73.2%	11.7%

Table 1: Analysis of logged chat sessions
(NB only child turns have been counted)

120	Jabir	once upon a time i got abducted by four Aliens. they took me in there space ship and swore to kill me so I did my raping bad man way and beat thay back side goog Jabir Dj Funk gravity 99" click

Example 1: Longest single turn 30/4

188	Shabbana	Men and women all have equal rights to anything done in a family house - hold. People say that a father is the head of the house but to me I think that the person who wrote that is not clever. This is because I feel that anyones mum and dad is the head of the house. I feel that mums and dads and children shoulld all become a team and do all the house work together. Not just the mum doing all the work.

Example 2: Longest single turn from 9/7

Example 1 and Example 2 also indicate how the quality of exchanges changed during the study. In later sessions, the children were more able to use reasons to support and justify their opinions; furthermore, those reasons are more likely to be coherent. For example on 7/5, Mustafa gave the following reason for liking pop (Example 3) but it begs the question because, obviously, nobody likes music that they do not consider good.

13	Mustafa	I like pop music because they are good unlike Jazz.

Example 3: Supporting reason from 7/5

Example 4, on the other hand, shows a functional argument supported by some evidence: (following Kuhn et al [1997] who categorised arguments as non-justificatory/ justificatory and non-functional/functional):

90	Mustafa	I think men are offered more jobs than women becuase women are sometimes weak and can't lift heavy things like men.

Example 4: Argument from 2/7

As the programme developed, children were also more likely to ask for and pay attention to the views of other participants. In the early weeks children tended to disagree without reasons, dismissing opinions with which they did not agree. For example, in Example 5, Mustafa, Drake and David use repeated 'z's to express their disdain for jazz.

18	Mustafa	why do you like JAZZZZZZZZZZ I think it's rubbish
19	Drake	raps got more listeners than jazzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzz
20	David	Drake, Tell that Jabir to stop talking about jazzzzzzzzzzzzzzzz!

Example 5: Disagreement 7/5

In Example 6, however, are some of the responses to Mustafa's comment that "women should be at home for the men". Although there is still some disdain, there are also the arguments that
a. times have changed;
b. women and men should be equal (functional);
c. women will not want to marry a man who thinks that women should stay at home (functional);
d. in real families, women do not stay at home.

78	Tosia	Mustafa is living in the past. Things have changed Mustafa. Wake Up!!!
88	Liam	womenand men should be equal and should not be (at home waiting for the man) as Mustafa said
101	David	Mustafa do you intend to have a job and a wife when you're older or are you going to carry on being sexist?
128	David	Mustafa do you live in the kind of family you are advertiving "Where the women cleans the house and the man goes out to work".

Example 6: Disagreement 9/7

In the early sessions, many of the children wrote in a simple, mainly descriptive way, suggesting that they were working from a 'knowledge telling' model of writing. However, as the chat progressed, the arguments became more complex, possibly indicating an increased maturity leading to the beginning development of 'knowledge transformation'. Example 7 and Example 8 demonstrate this change.

15	Drake	rap is probably one of the baddest kinds of music because of the beat and lyrics

Example 7: simple, descriptive writing(7/5)

13	Drake	I agree with David in the Black department but the uniform bit don't even go there. If people were so bothered about what school they could just ask it's like the only reason we have to wear the school uniform is to show people what school we go to. There should at least be a separate class for separate people who want to learn about their black roots. It would be good to be able to learn this so in the future we can say this school has taught me this.

Example 8: Complex, transformational writing (18/6)

Limitations of the study

The study is limited by the fact that there was only a small group of students who did not all attend classes consistently. This means that the performances of some children did not change to the same extent as those of the children who attended more regularly. Furthermore, whereas the online *behaviour* of regular attenders changed as the study progressed, the irregular attenders tended to exhibit the same behaviour patterns in later sessions as they had done in earlier ones. This was potentially disruptive to the group as a whole.

Discussion

The most striking result of the online chat is the extent to which the children's writing increased in length and complexity. They were more able to use reasons to support and justify their opinions and were give consideration to the views of other participants. In Pennington's terms the children were "Writing Easier" and "Writing More" and "Writing Differently" [Pennington, 1996].

Although some children had these skills from the outset, others developed them during the programme. This suggests that the children were increasing in self-assurance: both in the belief that they had something which was worth saying and in their abilities to write it coherently. This is supported by the children's own evaluations in which some of the pupils commented that they had become more confident as a result of the CMC.

The children seemed to realise a need to communicate their ideas and opinions to other members of the group. Furthermore, in the later weeks the children were willing to challenge those whose opinions were not sustained by evidence. Some of the children commented that they had learned to pay attention to other peoples' opinions and to see matters from different perspectives.

There is some fluctuation in the results; for example, 14/5 had shorter mean turns than the two preceding weeks but significantly more turns on topic. 9/7 had shorter average turns than 18/6 or 2/7 (although still significantly longer than the earlier sessions) with fewer turns containing reasons. This could be due to variations in topic; there was a lot of agreement on 9/7, for example leading to a number of short turns such as 'yes' or 'I agree'. Discussions became more focussed as the children gained confidence; in the early phase the children suggested broad categories such as 'pop music' but as the programme progressed, they were more likely to pose questions such as, "Is school fair?"

It should be noted that the tutor believed the chat had helped children to take more care with spelling and grammar. The children often challenged each other's spelling/grammar and the tutor thought that this encouraged children to think more about making their writing understandable. This suggests a developing awareness of audience.

Conclusions and Recommendations

The results indicated that the chat facilitated an increase in the children's confidence in their own writing abilities, in their self-esteem as writers and an enhanced awareness of audience. This improved the children's ability to construct and put forward an argument, showing a move from knowledge telling to knowledge transformation. However, the CMC chat was informal and did not require the children to write extended texts where the writer needs to consider the overall structure and genre of a document. Therefore, a bridging programme needs to be designed so that the children can transfer their new skills to other writing contexts. This could comprise the following stages:

1. CMC discussions;
2. Collaborative authoring (for example, using MS Word with NetMeeting);
3. Individual authoring and collaborative editing/revision, sharing documents via email;
4. Individual authoring.

More detailed and systematic research needs to be carried out in order to determine how far text-based CMC enhances the self-esteem and confidence of developing writers. There should also be pre and post testing of children's written work in other contexts in order to determine the extent to which skills developed through the programme can be transferred to other situations.

Note

In the interests of confidentiality, the names of all the children have been changed.

Acknowledgements

This research is funded under ESRC Case studentship in collaboration with Chapeltown and Harehills Assisted Learning Computer School. Thanks are due to Mr Brainard Braimah (Director CHALCS) and Mr Abdul Jalloh (Literacy Tutor CHALCS) without whose support this work would not be possible.

References

Beauvois, M. H. (1997). "High-Tech, High-Touch: From Discussion to Composition in the Networked Classroom" in *Computer-Assisted Language Learning 10*(1): 57-69.
Bereiter, C. & Scardamalia, M. (1987). The Pyschology of Written Composition. Hillsdale NJ, Lawrence Erlbaum and Associates.
Burnett, R. E. (1993). "Decision-Making During the Collaborative Planning of Coauthors" in Penrose and Sitko Hearing Ourselves Think: Cognitive Research in the College Writing Classroom. Oxford, Oxford University Press: 125-146.
Flower, L. & Hayes, J.R. (1980/1994) "The Cognition of Discovery: Defining a Rhetorical Problem" in S. Perl, Landmark Essays on Writing Process, Davis, California: Hermagoras Press. **7:** 63-74.
Harwood, D. (1995) "The Pedagogy of the World Studies 8-13 Project: the influence of the presence/absence of the teacher upon primary children's collaborative group work." in *British Educational Research Journal 21*(5): 587-611.
Kuhn, D., Shaw, V. & Felton, M. (1997). "Effects of Dyadic Interaction on Argumentative Reasoning" in *Cognition and Instruction 15*(3): 287-315.
Mercer, N., Wegerif, R. & Dawes, L. (1999). "Children's Talk and the Development of Reasoning in the Classroom" in *British Educational Research Journal 25*(1).
Neu, J. and Scarcella, R. (1990) "Word Processing in the ESL Writing Classroom: A Survey of Student Attitudes"" in P. Dunkel Computer Assisted Language Learning and Testing New York, Newbury House.
Pennington, M. (1996). "Writing the Natural Way: on Computer" in *Computer Assisted Language Learning 9*(2-3).
Phinney, M. (1990). "Computer-Assisted Writing and Writing Apprehension in ESL Students." in P. Dunkel, Computer Assisted Language Learning and Testing, New York, Newbury House
Ravenscroft, A. & Hartley, R. (1998). Evaluation of Chapeltown and Harehills Assisted Learning Computer School (CHALCS). Leeds, Computer Based Learning Unit, University of Leeds.
Robertson, J. Good, J, & Pain, H. (1998) "BetterBlether: The Design and Evaluation of a Discussion Tool for Education" in *International Journal of Artificial Intelligence in Education*(9): 219-236.
Sullivan, N. & Pratt, E. (1996) "A Comparative Study of Two ESL Writing Environments: A Computer-Assisted Classroom and a Traditional Oral Classroom" in *System 29*(4).
Warschauer, M. (1996) "Comparing Face-to-Face and Electronic Discussion in the Second Language Classroom." *CALICO Journal 13*(2): 7-26.
Warschauer, M. (1999) Electronic Literacies Mahwah, New Jersey: Erlbaum.

World Wide Web

CHALCS http://www.chalcs.org.uk
WebCT http://www.webct.com/

Appendix - Children in the Study

	Girls	Boys
Asian (Pakistani)	5	
West Indian	4	5
African	1	
Arabic		1
Arab/Asian		1
African/White		1
White	1	
Total	**11**	**8**

Table 2: Children in the study cohort by sex and ethnic group

School year (age)	Number of children
6 (10-11)	1
7 (11-12)	4
8 (12-13)	6
9 (13-14)	7
10 (14-15)	1

Table 3: Ages of the children in the study cohort

Evaluating an Open University Web Course: Issues and Innovations

Martin Weller

Faculty of Technology
The UK Open University

Milton Keynes

MK7 6AA

e-mail: m.j.weller@open.ac.uk

Robin Mason

Institute of Educational Technology

The UK Open University

Milton Keynes

MK7 6AA

e-mail: r.d.mason@open.ac.uk

Abstract

In 1999 the UK Open University (UKOU) piloted an innovative web based entry level course which provided an introduction to the Internet and computers. The course represents the UKOU's first large scale offering which is solely web based, with online tuition. The course was piloted with 850 students, and extensive evaluation was undertaken. This paper identifies six main issues which affected student's satisfaction and performance on the course: the skills taught in the course; the level of starting knowledge; the use of computer conferencing; participation in online group activities; online tutor support; and time associated with studying. In general the course was successful and student satisfaction was high amongst those who completed it. In 2000 the course is being presented to over 12,000 students.

Key words

web-based teaching, computer conferencing, collaborative work, online tutoring, virtual university, student experience

Introduction

This paper examines the issues which arose from the evaluation of the pilot study of an innovative, on-line course delivered by the UK Open University (UKOU). The evaluation was by means of three web-based questionnaires given during the course and follow up telephone interviews.

The course was *T171 You, your computer and the Net.* It is an entry-level course about information and communication technology (ICT), delivered entirely over the web with online tuition. The course is studied part-time over 32 weeks, and counts for 30 CATs points. The course consists of three modules, and has been described in detail elsewhere (Weller 1999). It was piloted in 1999 with 850 students, and in 2000 has 12,000 students registered.

The course is innovatory for the UKOU in a number of ways:

- there is no provision for face-to-face tutorials

- the course content, apart from two set books, is entirely on the web

- the combination of ICT skills teaching to complete beginners, online group work, and very large scale online delivery (even by OU standards) is probably unique in the world.

1. The Skills Issue

Many students felt some dissatisfaction about the lack of skills training they received on the course. The first module gives students skills in using common software applications, creating web pages, as well as more general academic skills. The second two modules of the course use the history of the computer and the Internet to teach about the technology and its impact upon society. A good two thirds of the 150 or so students who filled in questionnaires found this balance between the 'how' and the 'what' very appropriate.

The course is about the personal computer and the Internet and what these technologies can do, so there is a need to teach skills in searching, managing, browsing and creating information. But these skills are not the traditional stuff of an undergraduate degree. So on the one hand, there is the tacit academic view that credit is not given for skills but rather for understanding; on the other, there is demand from students for job-related skills. This tension between the training and academic level arises in many ICT courses. As an entry-level course which can count toward a university degree, T171 needed to be of a suitable academic standard. However many students wanted to learn software skills, and were interested in this one course, and had no intention of studying further.

Module one of the course has an activity based approach, and introduces students to common applications such as word processors, spreadsheets, graphics etc. It also gets students online, using e-mail, and writing web pages. At one level this can be seen as training, but it is integrated with academic material about group formation, communication, clients and servers, and so on. There is also a strong emphasis on learning to learn, so students new or returning to study can develop their study skills.

The level of computer skills amongst the general population is constantly improving, so what a course needs to include one year may become assumed in later years. This is particularly true of a level 1 course delivered via this medium. Many students were completely new to study, and to the medium itself, and some account must be taken of this in the achievements the course recognises. People are very familiar with print and text, but not so with web sites. Thus in some respects the course is introducing people to a new learning medium.

Many students feel they want the skills training because this will help them with employment. However, it is increasingly the case that employers are looking for more than just skills in one software package, but rather transferable skills, or at least evidence of a broader knowledge. T171 tries to maintain a balance, in that it provides sufficient skills, such as basic HTML, and it gives students the context and opportunity to develop these further. By teaching students concepts as opposed to processes, their software skills can go beyond that which is taught explicitly in the course, and indeed beyond what they would gain from a straightforward training course. This was borne out by the sophisticated web sites many students created for their end of course assessment. Students also gain an appreciation of the wider implications and possibilities of these technologies.

As with many courses, students' expectations about the course play a critical role in their ultimate satisfaction. For the 2000 presentation the preparatory material states very clearly that students should consider T171 an academic course, and not a training course.

2. The Novice Issue

This course requires no prerequisite knowledge and no previous experience with the computer. Yet amongst the first cohort of students there was a very wide range of abilities: from those who had built their own computers to those who had bought their first computer specifically for this course. People have many reasons for taking courses, sometimes it is to gain knowledge about a totally new subject, to gain accreditation for knowledge they already have, to work towards a specific degree, or simply to consolidate knowledge they have gained on a 'piecemeal' basis over the years. There is an issue therefore of trying to keep many different types of students satisfied.

The course was created deliberately as one with broad appeal, both in terms of computing experience and subject area. In the pilot year the course mailing did not go out sufficiently early, which meant that computer novices did not have sufficient time to get comfortable using their PC before the course started. This meant that many students who were entirely new to computers went through a very steep learning curve at the beginning of the course. Some dropped out complaining that it was far too difficult; most of those who stuck with it until the end reported a tremendous sense of achievement. For the 2000 presentation students are provided with a preparatory activities booklet, and a much longer preparatory period.

At the other end of the continuum is the difficulty of keeping happy those students who already have a good grounding in this area. The course tried to achieve this through several means. The first of these was the use of group work via computer mediated conferencing (CMC), which many students had not experienced before. The second was to provide a broad range of material to provide interest for the more technically advanced students in aspects they may not have considered before, such as the social impact of the technologies, or the management structures of ICT companies.

In addition, the assessment, particularly in modules 2 and 3 was quite open-ended. Students chose from one of two titles, and were asked to produce a 'web-essay'. Students with a good grounding in the material already could use the web as a research tool, and integrate images and links into their document. Many students found the assessment a rewarding task to perform.

3. The Conferencing Issue

There has been a good deal of evaluation of the use of computer conferencing as a means of interaction between students and tutors on distance education programmes over the last ten years (e.g. Mason, 1998; Salmon, 1999; Wegerif, 1998). One way of characterising its use as an educational medium, is to say that its strengths are also its weaknesses:

- it doesn't require fixed times for study, but consequently other demands on one's time easily take precedence

- it maintains a record of all interactions – but this makes many people wary of committing their ideas to such a public forum

- it allows everyone to be 'heard', but this leads to an overload of messages which many find completely overwhelming.

One of the paradoxes of this medium which is very apparent in the student feedback of this course lies in the disparate perceptions that on the one hand, there were too many messages or that, on the other, there was too little participation. Nevertheless, as is usual with computer conferencing, there were many students who found the medium very satisfying, and a vital element in their learning experience.

The dissatisfactions expressed about computer conferencing on the course were sometimes contradictory. Newcomers to the computer tended to find the number of messages overwhelming and the competence and tone of the messages from experienced computer users very off-putting. At the same time, one of the biggest complaints about the tutor group conferences was the lack of participation.

The course conferencing environment consisted of tutor group conferences in which each tutor and the 12-15 students assigned to every tutor were expected to raise course related issues and problems. In addition there were course-wide subject conferences to discuss the major topics in each module and technical support conferences on topics such as word processing, networking, databases etc, moderated by specialist staff. Some of the conferences worked better than others and what some students regarded as "life-saving", others found off-putting. A number of students suggested that those new to computing have their own groups and conferences, whereas many students found the support of the experienced students invaluable.

A strong conferencing element is an integral part of the course, given its aim of introducing students to computers and the Internet. The use of conferencing was an important means of engaging students, as well as the means through which they could gain support. Sending and receiving messages was thus the first activity in module one.

For many people this is a new medium, and they are learning the appropriate skills. As many students are new to study, they felt frightened of missing something so read every message. Although the course materials stressed that students were not expected to read all of the messages or all of the conferences, it may be that some students can only develop the confidence to do this through experience.

Active discussion has long been one of the aspects which is difficult to provide in distance education, with tutorials and summer schools being the usual means of achieving this. The course wide subject conferences were a good means of discussing issues such as the role of Microsoft in the industry. As well as providing further interest to the material this helps students test their understanding of concepts through dialogue, which can then be refined iteratively.

However, many UKOU students choose to study at a distance precisely because they prefer to work alone, so there is an issue as to what degree the course should force people to participate. As UKOU students are adults we preferred to give them the opportunity to do as much, or as little, conferencing as they wanted or needed.

4. The Online Group Work Issue

One of the central features of the traditional UKOU student support system is the face-to-face tutorial held in study centres around the country. This course is the first level one undergraduate course to dispense completely with face-to-face meetings. It does, however, include a number of group activities and an assignment requiring a group web page.

There is a whole research literature on group work as a method of teaching and learning (e.g. Tiberius, 1999) and a growing body of studies into its application in the online environment (McConnell, 1994; Hodgson and McConnell, 1995). There were many complaints about the group work demands on this course, stating that students did not want to participate in group activities, or that they are too difficult to perform via this medium.

These kinds of responses have been noted on other OU courses with a group work component (Mason, 1995; Thorpe, 1998). Nevertheless, feedback from modules two and three questionnaires contained many complaints from student that there was no group work.

The course aims to give students a taste of group working as one of the important features of networked computing. The group work aspect fulfilled a number of roles on the course. By getting students to engage in an activity using CMC in module one, it encouraged them to become familiar with the technology which would then be useful throughout the rest of the course. As the group activity was linked to assessment, it also meant students had to get used to coming online, and communicating with others. They were thus able, and willing, to ask for help and advice through the rest of the course from conference moderators, but more importantly from each other.

In conventional UKOU courses attendance at face to face tutorials varies but averages about 50%. Many students, for a variety of reasons, can never attend tutorials. Online tutoring allows all students to participate in the tutorial experience, and thus helps foster the sense of community.

It is also true however, that many students simply did not like this method of study. They much preferred the traditional UKOU course, with printed course material, face to face tutorials, summer schools and so forth. For such students it is debatable if online group work can ever effectively replace face to face meetings. While online tutoring is particularly appropriate for this course, it may not be the case for all courses. With a modular degree structure students can experience both types of course presentation, and may well find that they prefer one form over another.

5. The Tutoring Online Issue

Student surveys conducted by the Institute of Educational Technology over nearly thirty years demonstrate that the support and guidance of the tutor is a crucial component in students' satisfaction with their learning experience, and this is true also for technology-based courses (Bates, 1995). So a course without face-to-face tutorials, which is trying to teach IT skills and expecting students to work collaboratively, is going to rely heavily on the quality of its tutors for the satisfaction and success of its students.

There is a whole category of adult distance learners who just want to get on with the materials in their own time and who rarely, if ever, contact their tutor. Another category, of about equal numbers, want a great deal of input from their tutor and constantly request more tutorials, more tutor comments in online conferences, more teaching, more controlling of overly talkative students and faster responses to emails. This course was no exception. Some tutors obviously provided exceptional support: prevented students from dropping out and made the course very enjoyable for others. Feedback from tutors on this, as on other OU courses which use computer conferencing, shows that tutoring online is perceived as more time consuming and that students are more demanding than on traditionally tutored courses (Mason, 1999). In anticipation of this, the course team prepared a range of materials for tutors (e.g. suggested activities for their tutor group conferences, some mid-course review materials and information to use in advising students what follow-on courses were available after completing this course). Tutors found most of these materials very useful, but they did not reduce the overall workload of tutoring the course.

It is evident from some of the student feedback that a number of tutors put little effort into moderating their tutor conferences. In some cases, students of such tutors got on with group working despite their tutor's absence, or they gravitated to other conferences where help and advice was available from central staff or from other students.

In the year 2000, more than 12,000 student have registered to take this course which has meant the demand to find good tutors with the necessary skills and provide the sufficient staff development has forced a quota to be placed on student numbers.

The tutor overload was experienced particularly during module one, when many students were encountering their initial problems, and as an activity based module it required greater input from the tutors than the other two modules. The content of module one has been reduced slightly for the 2000 presentation in recognition of this.

Again it is careful to frame expectations of students. The T171 tutors are only appointed part-time and so cannot act as computer technicians for students. Their role is to support the student and the academic material. It is the student's responsibility to have a functioning computer and Internet connection. The immediacy of the medium can sometimes lead to unrealistic demands on tutors. Some tutors arranged specific days of the week when they would check for messages, so that students knew that they may not get an immediate response, but they would get one by a specific day.

6. The Time Issue

It has become a commonplace to note that time has become a precious commodity. With the advent of telecommunications technologies, distance is less a barrier to education than it was before the networked personal computer. For many students with busy lives time has now replaced distance as the barrier in higher education.

Related to this, it is common in UKOU surveys for students to complain that courses take them longer to study than the 10-12 hours per week expected on a full credit course. It is particularly common for students to complain about the workload on new courses in their first year of presentation. This course was, again, no exception to the rule.

Students new to computing said they spent three, four or five times longer, especially in the early weeks of the course. In later modules, many students complained about the amount of reading, especially reading from a monitor. There is general agreement in the tutor feedback that module one was somewhat overloaded, as was the first assignment.

This course combines a number of elements notorious for taking large amounts of time:

- browsing the web
- interacting in computer conferences and working in groups
- getting to grips with a personal computer.

New learners in particular can spend a disproportionate amount of time on such tasks. The time pressures many students experienced raises the question of whether it is possible to teach IT skills to beginners at a distance. For many students, the course was evidently successful in this respect, but for others it was not. For the 2000 presentation instructions to students have been refined further and several time-saving options made available for them, for instance the provision of a standard template they can use for creating their group web page.

This returns us to the previous point regarding the need to retain academic credibility. Academic credit is awarded for the nature of the task, not the time taken. So for instance, if a student has spent a long time reading conference messages from other students, whilst this may have helped their understanding of the concepts, it is not activity which replaces the core course work.

The amount of time put in by students should not always be viewed as a negative factor. In many cases this reflects their enthusiasm for the course and the web in particular. This was often exhibited in the resources they had located for the assignments and the design work put into them. This was not necessary to complete the assignment, but in doing so the student made the learning experience more rewarding and meaningful.

Conclusions

We have examined this innovative course from the students' perception of the issues raised by web-based teaching. The feedback from students indicates that the main issues were:

- the time it took to become competent with the PC, the Web and/or with computer conferencing

- the sense of accomplishment and satisfaction with the course and the experience it provides of the whole ICT world

- the appropriateness or not, of teaching ICT skills and of working in online collaborative groups.

The factors which most affect students' satisfaction relate to:

- the support of their tutor or other staff or students

- the amount of time, patience and motivation they have to devote to the course

- the extent to which the course content and presentation fit the students' expectations and learning style.

Bibliography

Bates, A. (1995). Technology, Open Learning and Distance Education. Routledge, London.

Hodgson, V. and McConnell, D. (1995). 'Co-operative Learning and Development Networks,' Journal of Computer Assisted Learning, 11(4), 210-224.

McConnell, D. (1994). Implementing Computer Supported Cooperative Learning. Kogan Page, London.

Mason, R. (1995). Using Electronic Networking for Assessment. In: Open and Distance Learning Today (ed. F. Lockwood), Routledge, London.

Mason, R. (1998). 'Models of Online Courses', Asynchronous Learning Networks Magazine, vol. 2, issue 2, October (online). Available: http://www.aln.org/alnweb/magazine/vol2_issue2/Masonfinal.htm

Mason, R. (1999).IET's Masters in Open and Distance Education: What have we learned? Available: http://iet.open.ac.uk/pp/r.d.mason/MAEval.PDF

Salmon, G. (1999). "Computer Mediated Conferencing in Large Scale Management Education." Open Learning (June), p. 45-54.

Thorpe, M. (1998). 'Assessment and 'third generation' distance education, Distance Education, 19 (2), 265-289.

Tiberius, R. (1999). Small Group Teaching. Kogan Page, London

Wegerif, R (1998) The social dimension of asynchronous learning networks. Journal of Asynchronous Learning Networks, Vol 2, 1. (http://www.aln.org/alnweb/journal/jaln_vol2issue1.htm#Wegerif)

Weller, M. (1999) "A large scale Internet based course for computer beginners" in Collis, B. & Oliver R. (eds) Proc. Of EdMedia 99, Seattle, Washington, USA. AACE, Vancouver.

Web-based Learning: Size Matters

Peter Williams, University College Scarborough, England

Abstract

This paper considers some issues related to a web-based vocational course in management for small businesses. Aspects of *size* are examined: the size of the working groups, the size of the course units and the scale of the support infrastructure needed. These aspects appear to have had an important bearing upon the targeting of course materials to clients and upon client retention. On the basis of this experience plans are outlined which aim to improve the effectiveness of client-client and tutor-client communication and to make the course attractive and useful to a wider market.

Background

The course, which is marketed as *Business First*, is offered by University College Scarborough, a small higher education institution situated on the east coast of northern England. The course is delivered by flexible learning via a website and supplemented by face-to-face activities. Start-up costs were underwritten by the European Social Fund 5B Programme, making it possible for the College to set up a dedicated website and for each course client to be loaned a computer with Internet access. The content of the course is derived from six modules of the College's BA degree in Business Management and is offered as a Higher Education Certificate in Management validated by the University of York. Each of the course units is led by an academic unit tutor and supported by educational, technical and administrative staff. The first cohort of 36 clients entered in February 1999 and will complete the course in December 2000.

Course client profile and induction

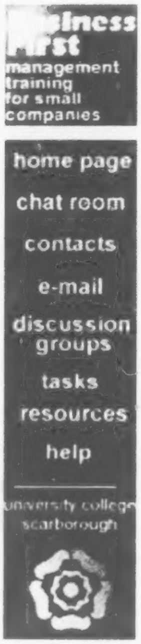
Typically, the clients are owner-managers of small companies in the Scarborough district. Their ages span 24 to 63 years, in a fairly symmetric distribution, and almost three-quarters of the group is male. An examination of clients' 'business cards' posted on the course website indicates that the stated reason for taking the course was predominantly career-oriented: clients hoped to develop management skills in order to make their company more successful, and/or to gain a management qualification as a stepping-stone to further advancement. Data from clients' course registration forms show that although a third claimed educational qualifications equivalent to (English school certificate) Advanced Level or above, many had left school at the earliest opportunity with minimal qualifications.

As the client group included 'rusty learners', there was a need for preparation in study methods. The book *Manager's Good Study Guide* (Giles, 1994), produced for students of the British Open University's Open Business School, was issued to all clients at the start of the course. A 'guide to the Guide' was produced, and sections in the guide were related to the first unit of the course. The ability to use a computer and to access the course website was essential, so clients' information and communication technology (ICT) skills were profiled by questionnaire some weeks before the start of the course. Experience ranged from absolute beginners who had scarcely touched a computer before, to a computer programmer. While less than a quarter of the group could be judged as adequately competent at that time to cope with the ICT requirements of the course, about a third were identified as being in need of careful induction and support. Prior to the start of the course a programme of evening ICT workshops was offered at the College. The workshops, which were well attended, covered basic computer skills and an introduction to the course website, including how to use electronic mail, computer conferencing and World Wide Web resources. In the final session clients collected their laptop computers, receiving instruction in their operation and maintenance.

Initial delivery methods

Each course unit, spanning twelve weeks, begins with an evening launch session at the College. This presents an overview of the unit content and provides important face-to-face contact between staff and clients. After this launch the main work of the unit is undertaken via the course website.

Specially developed software for the website employs Microsoft *Outlook* as a communication engine accessed through an HTML web page 'front-end'. The decision not to buy in an existing web course authoring system was made after extensive examination of available products. In view of clients' lack of ICT experience it was important for the interface to be very simple to operate, especially for the computer conferencing application, where user disorientation can occur in mature conferences (Collins & Bostock, 1993). In addition, it was judged important to retain a high degree of control and flexibility over the development environment so that course materials might more easily be adapted for future application elsewhere. A navigation toolbar on the left of the page provides access to the following functions.



- Home page – course noticeboard
- Chat room – synchronous text communication
- Contacts – an address book of clients and staff with links to individuals' business cards and photographs
- E-mail – a full Internet electronic mail system supporting multiple file attachments
- Discussion groups – asynchronous computer conferencing, supporting threaded discussions and multiple file attachments
- Tasks – the course content organised under six units
- Resources – links to course information, website resources, multiple-choice tests, *etc*
- Help – frequently asked questions and other support.

The course units were made available in a timed sequence in order for clients to move as a group from unit to unit. Initially, the units were structured according to the internal logic of the academic discipline. The use of management textbooks, CD-ROMs and business education websites formed an important part of the course activities – as they do in the undergraduate modules from which the units had been derived. The first unit of the course (*Management in Practice*) – covering organisational behaviour and management styles – is discursive in nature and much reliance was placed upon discussion groups as a forum for clients to relate management theories to their individual business situations. The Tasks area of the first unit was predominantly text-based, with some minor use of PowerPoint-style slide presentations supported by voice commentary.

Problems encountered

There was a high level of client activity at the start of the first unit. The administrative and technical support staff fielded many technical queries and the unit tutor found herself spending up to an hour a day responding to e-mail and computer conference postings. In order to reduce the likelihood of clients becoming overwhelmed by 'information overload' (Nixon & Salmon, 1996), conferencing was being undertaken in smaller groups. After this initial phase – which lasted about a month – it was noted that the number of clients making regular log-ons to the website was falling and some group conferences were losing momentum as they were reduced to only two or three active members. Within a few weeks some clients had withdrawn from the course and others, while making occasional connection, made no contributions to group activity.

In retrospect, it seems that too great a reliance was placed upon computer conferencing as a learning medium. Its value has been extolled in distance education literature (*e.g.* Harasim, 1989; McLellan, 1997;Sherry & Wilson, 1997) to an extent which might be described as uncritical. In contrast, McCabe (1998) notes a tendency in such literature to confuse the potential of computer conferencing as a *medium* with it as an educational *approach*. Klemm & Snell (1996) go further, in being heavily critical of "*slavish* *acceptance of the threaded-discussion paradigm"*, which they claim results in relatively shallow 'discussion'. Perhaps another factor was the suitability of this medium to the client group. Textual exchange via computer was not a form of communication with which many were familiar, and some clients might have been reluctant to 'expose' their perceived limitations in written English in such a public way.

The problem of client retention is central to distance learning systems and the quality of course management and support has been the focus for wide discussion (Freeman, 1997; Rowntree, 1999b). The model of student learning presented by Morgan (1995) emphasises the central place of the learner's orientation to education as the major holistic motivation to study, and this can be seen as the key to success – or failure – in distance learning. Kember (1995, in Moore & Kearsley, 1996, p.209) postulates a model for the progress of adult learners in open and distance education courses which focuses upon the success with which students are able to integrate academic study requirements with competing social, domestic and workplace demands. Students with favourable backgrounds and situations tend to proceed on a positive track which can diverge markedly from that of others, whose difficulties with the academic requirements and problems in resolving competing demands may cause them to fail or withdraw. This issue of existing educational background as a predictor of success in distance learning has also been identified by Coggins (1989, in Moore & Kearsley, 1996, p.161) and Billings (1989, *ibid*) presents a model for student completion of correspondence courses in which dropout is seen to be the result of an accumulation of educational, attitudinal and environmental causes.

An analysis of exit interviews with clients who had left the course indicated that another contributory factor was its academic orientation. Clients who had joined the programme hoping to pick up 'quick fixes' to apply in their own businesses appeared to have been put off by the textbooks and the text-intensive website with its reliance on conferencing. The clients who remained were more likely to have undertaken tertiary education and to have acquired post-school qualifications. Some younger clients see the award of the Certificate in Management as a career qualification and so are motivated to succeed. A central problem for the course appears to be the tension between the requirement for 'academic rigour' entailed by university validation – which pulls in what Rowntree (1999a, pp.39-40) calls a *dissemination* direction – and the objective to make the course a catalyst for change and real business development for the clients – which is characteristic of Rowntree's *development* model, seeking first to address learners' needs.

Improvements to course content and structure

Having identified the problem and its likely causes, the course team are currently in the process of implementing a number of potential solutions.

The appearance and academic orientation of the course content is being transformed. Effort has been made to redesign the latest unit of the course from the perspective of the learner, rather than in a form determined by the subject matter, and to make course tasks more problem-based and realistically situated (Teles & Collings, 1997). The work of this unit (*Human Resource Management*) is built around a simulation of a small company, and on the website is a greater use of interactive graphics and audio commentaries. Textbooks are now used as support reading rather than as core work. Computer conferencing has a more utilitarian focus than before and small group conferences have been abandoned in favour of whole-group activities. The results to date have been encouraging, and clients have welcomed these changes.

In addition to a reorientation of content the overall structure is undergoing change. The six units of the course were derived from undergraduate modules, and while such a structure is appropriate for conventional campus-based delivery, it is proving too inflexible for the new purpose. Rather than present the course in six large blocks in a strict order with start and finish dates, the course in future will be offered in smaller blocks, with greater client choice over order and timing and the option of selecting from a larger pool of content. This move to *Learning Objects* is taking place elsewhere and is a relatively recent development, but one which seems likely to have major effects on the emerging market for online learning (Shepherd, 2000). The new-style course will be launched shortly, with a view to recruiting a far larger intake. The implications of this are considerable, not only for course content but also for the provision of client support.

Improvements to client support

In the early part of the course client contact was channelled through an administrative assistant, who routed technical help to the website developer and academic guidance to the unit tutor; while the size of the client group has fallen, this level of support has proved adequate. The new course, with a larger number of clients – all at different stages with a large number of learning objects – will not be so easy to manage. The two types of client needs, for:

- administrative and technical help
- academic support

will be addressed separately.

The provision of administrative and technical help will be partly automated using improved client tracking software. The existing system uses an online form for staff to register the details of their contact with clients. What is now being developed is a relational database to include:

- details of clients and their computers
- course registration and fees payment records
- learning objects progress and assessment records
- a log of all client contacts, including attendance at face-to-face meetings and events
- various questionnaire and feedback returns.

This client support database can then be used as a comprehensive management information system for the course.

Academic support for distance learners can take a variety of forms. Freeman (1997, p.49) identifies five principal functions:

- as a subject expert
- as a gateway to other resources
- to give feedback on progress
- to encourage/assist with personal problems
- to assess learners.

Provision for the new course will be made at two levels. Graduate teaching assistants (with recent degrees in business management) will provide operational level support, maintaining regular contact with clients and fielding generic queries. The full-time academic staff leading the existing course units will adopt a quality oversight role, making more occasional contact but employing their specialist expertise and directing the assessment process. The teaching assistants will undergo an induction programme to fit them to their role.

Conclusion

In web-based learning, size matters! From the experience of the *Business First* course, there appear to be optimum values for the size of the learning groups, the size of the course units and the scale of the infrastructure needed to support even a modest number of learners. Web-based learning is not an easy option, for the learners or for the providers. For the learners, it requires high levels of commitment and it suits some people far less well than others. For the providers, it is *not* enough to 'post your lecture notes to the web', as the retention of those learners poses complex problems for which there are no simple solutions.

References

Collins, D. & Bostock, S. (1993) 'Educational effectiveness and the computer conferencing interface', *ETTI*, 30(4), pp.334-342.

Freeman, R. (1997) 'Managing tutor support systems', *Managing Open Systems*, Kogan Page, London.

Giles, K. (1994) *Manager's Good Study Guide*, Open University Press, England.

Harasim, L. (1989) 'Online education: a new domain', in Mason, R. & Kaye, A. (eds), *Mindweave: Computers, Communications and Distance Education*, pp.50-62.

McLellan, H. (1997) 'Creating virtual communities via the Web', in Khan, B. (ed).(1997), *Web-Based Instruction*, pp.185-190.

Moore, M. & Kearsley, G. (1996) 'Factors affecting student success', *Distance Education: a Systems View*, pp.159-164, Wadsworth.

Morgan, A. (1995) 'Student learning and students' experiences', in Lockwood, F. (ed.) *Open and Distance Learning Today*, ch.6, Routledge, London.

Nixon, T. & Salmon, G. (1996) 'Computer-mediated learning and its potential' in Mills, R. & Tait, A. *Supporting the Learner in Open and Distance Learning*, ch.7, Pitman, London.

Rowntree, D. (1999a) 'Preparing for course development in ODL', Overview Essay, H804 Block 2 Course Guide *The Implementation of Open and Distance Learning*, The Open University, England.

Rowntree, D. (1999b) 'The tutor's role in supporting distance learners via computer conferencing' H804 Course Essay, The Implementation of Open and Distance Learning,
<http://www-iet.open.ac.uk/pp/D.G.F.Rowntree/Supporting%20online.htm>
(Accessed 4 March 2000) The Open University, England.

Shepherd, C (2000) 'Millenium gazing', *IT Training*, p.52, February 2000, Institute of IT Training, Haymarket Business Publications, London.

Sherry, L. & Wilson, B. (1997) 'Implementing Web-based instruction', in Khan, B. (ed).(1997), *Web-Based Instruction*, pp.67-73.

Teles, L. & Collings, T. (1997) 'Virtual experiments and group tasks in a Web-based collaborative course in introductory electronics', in Khan, B. (ed) (1997), *Web-Based Instruction*, ch.53, Educational Technology Publications, New Jersey.

ON-LINE LEARNING USING BROADCAST MATERIALS
Case study of the BBC On-line Learning Pilot programme in Women's Health

Sheena Banks
Virtual Campus Programme
Sheffield Hallam University

Professor David McConnell
Centre for the Study of Networked Learning and
Department of Educational Studies
The University of Sheffield

Introduction

This paper is based on a 1999 evaluation study of the BBC On-line Learning Pilot Programme in Women's Health which was jointly sponsored by the BBC and the Department for Education and Employment. The study involved 4 learning centres based in UK Further Education colleges and 128 learners.

The BBC On-line Learning Pilot Programme in Women's Health is an innovative example of how adult learners in different locations can gain access to broadcast media-originated Web-based learning materials with national accreditation. It aimed to attract new learners back into education using the "hook" of broadcast materials via the Internet. The aim of the this qualitative study was to highlight issues about the nature of learner and tutor experiences of BBC On-line learning, discuss the potential of this form of learning for meeting adult learning needs, how to develop good practice in the use of broadcast materials for on-line learning, delivery, costing issues and the opportunities for further development.

BBC Education produces a wide range of educational support materials designed to provide adults at home with more information about broadcasts and details about how and where they might take their interest in a subject further, and recently has developed a considerable number of interesting and comprehensive web pages specially designed to support its output and enable the viewer to extend their understanding of what they have seen. This BBC On-line Learning Programme in Women's Health was developed to explore ways in which links could be made between BBC broadcasts, its web sites and digital media to create learning materials. It provided a web-based on-line course which brought together pages from the BBC Education Health site to explore health issues that concern women.

The impact of broadcast media within on-line learning

Broadcast media can be seen as part of multimedia technologies now available to educationalists, particularly now that learners will have access to interactive multimedia learning facilities in their own homes. Many of these facilities are likely to converge with on-line computer systems and the internet. Bates (1999) in an EU study, assesses the impact of interactive TV and internet-based learning services to the home, and identifies particularly the potential of personalised TV services which enables set-top boxes to have memory capability to download multimedia content and video on demand.

Broadcast media has always been attractive to educationalists through its ability to capture the interest of viewers and to stimulate them into extending their understanding of what they have seen. There is also the attraction that broadcast media provides readymade "content" as the basis for on-line learning and is high quality. The richness of broadcast media content creates exciting possibilities for teachers to design more authentic learning material which has a visual immediacy and dynamism not possible with computer-mediated communications. However, it is not at all clear how broadcast media will impact on education in terms of the types of applications it offers, nor how this new capability will be integrated into current practice of on-line learning nor how broadcast material can be made readily available to educators. Broadcast media is successful as a mass medium but usually needs considerable tutor facilitation to work as an educational medium. It has proven success as a "hook" for attracting and motivating learners, but not necessarily supporting learning achievement. It may well be that in the near future educators will be able to gain direct access to broadcast learning space through the proliferation of cable and satellite channels and use this capacity to design and deliver on-line learning and create access to learning in new and innovative ways.

Focus of the evaluation

It was agreed with the programme stakeholders that the principal scope of the evaluation would be the learner/tutor/materials/technology and learning centre interface as experienced by the participants in the pilot programme. There would be a focus, in particular, on how learners, tutors and learning centres managed the interface between the provision of the BBC learning materials on the one hand and the use of these materials in learning scenarios on the other hand. The use of the BBC learning materials would present particular challenges to learners and tutors which would raise educational and technological issues and would result in the identification of new needs on behalf of the learners and the emergence of different delivery models of on-line learning.

Concepts of on-line learning

In this study we are using on-line (or "networked") learning as an umbrella term to describe learning that occurs over electronic networks such as the Internet, the World Wide Web and digital media. There are many configurations of practice of networked learning and for different purposes.

Mason (1998) in identifying on-line course models refers to an "integrated model" which brings together collaborative and group activities with learning resources. This is likely to be of most significance to adult educators considering the use of digital media for learning.
This form of learning is sometimes known as networked collaborative learning (McConnell 1998) since it emphasises the networking of learners and resources together and on social collaboration within a learning context - building a learning community.

The development of pedagogic models for on-line adult learning implies a re-examination and re-interpretation of contemporary adult learning practice to address a variety of issues concerning the process of adult learning and the relationship between the adult learner, those providing the course and the on-line learning environment. One of the educational issues in the development of personalised TV and broadcast materials for on-line learning is that the learners (or "viewers") will be on their own at home and likely to experience on-line learning as individuals rather than part of a group. Good practice in adult education focuses on working with learners in a "social" relationship that supports:

- the experiences, backgrounds and skills of the learner
- the wish amongst adult learners to share their ideas and experiences with each other

The current interest in delivering adult learning courses via ICT, the Web, the Internet and digital media is in danger of being driven by the technology and what it can offer and deliver, rather than being guided by a grounded understanding of the pedagogical requirements of adult learning practice (McConnell,2000).

The rich diversity of networked technologies can, however, be harnessed to create a learning context where our understanding of adult learning is foremost in the design of any ICT-bad learning event. Central to this is the need to incorporate opportunities for learners to converse, discuss and collaborate amongst themselves by the use of a variety of computer mediated communication tools and systems. The development of a sense of 'community' and belonging to a socially oriented group are basic requirements here. What does this mean for adult learners using ICT as the means to communicate with their peers?

The Networked Community

In conceptualising the meaning of community in cyberspace, it is possible to draw on existing definitions of community and contemporary Western thinking about communities, in order to try and understand what a networked learning community may be composed of. Several writers have tackled this issue (see Fernback, 1999; Smith & Kollock, 1998). In a review of the current literature as it relates to computer mediated communication (CMC) environments, Fernback (1999) offers three possible conceptions which can be used to help understand the nature of 'community' in on-line learning environments :

- **community as place** : networked groups can be viewed as communities that meet in cyberspace. Networked learning environments are places where the community of learners can develop. They have a unifying power to hold communities together. The social relationships possible in networked learning environments help participants form a view of themselves as a thriving community.

- **community as symbol** : networked learning communities have a symbolic dimension : participants give the community meaning, and create the community through their interactions and through their norms and values. This gives them a sense of identity, a place where meaning exists.

- **community as virtual** : in any context it is argued that communities live in the minds of their members : they are imagined. No less so than in networked communities who might be distributed across a continent or the globe, but to their members a community exists because they think it exists. Webs of personal meaning and relationships, and authentic discussion over long periods of time are indicators of the existence of community (Rheingold, 1993).

The socially constructed spaces of virtual learning environments are places where learners can meet to develop their sense of identity, common goals and community. However, crucial to this is that learners must feel empowered within these environments, that they are allowed to be active in using the resources available to them and that the learning content is authentic.

Alongside this desire to develop community is a theoretical view of how learners learn in these social environments : social constructionism. Salomon and Perkins (1998) focus on the debate around learning as something that takes place in the individual's mind, where knowledge and skill is acquired as discrete, transferable entities; and learning which occurs in collective, participatory settings of "active knowledge construction emphasizing context, interaction, and situatedness" (Salomon and Perkins, 1998). Four meanings of what can be termed "social learning" are elaborated which can form the basis for the design and implementation of on-line learning in adult education contexts:

- **social mediation** : here a person or a group helps an individual to learn.
- **social mediation as participatory knowledge construction** : here the focus is on participation in the social process of knowledge construction.
- **social mediation by cultural scaffolding** : here the emphasis is on the use of tools in mediating learning.
- **the social entity as a learning system** : the focus here is on learning that occurs in groups, teams and other collectives.

These four perspectives form the basis for a critique of a sociocultural perspective on learning, and of how the individual and social might relate. By focusing on the situated versus the cognitive, and the social versus the individual dimensions of learning, we can ask how individual and social learning relate to one another, and how these can be used to contribute to the development of the learning community. Key questions for adult learning practitioners are :

- in what ways is individual learning less or more socially mediated learning ?
- how does the distribution of learning become manifest and managed within a group ?
- what is the relationship between these two aspects of learning (individual and social) : how does the one support the other (as Salomon and Perkins, 1998 hypothesise they do)?
- is 'community' possible in networked learning or broadcast mediated environments? Our practice and research suggests the answer is "yes". However, a key question is how this can be achieved.

Focus and methods of the evaluation

The aim of the action research methods used in this evaluation study were to encapsulate key aspects of learner and tutor experiences. Evaluation data was collected by questionnaire, interviews and learner survey. The learning centres were expected to give advice to learners, support learners, facilitate contact between learners, provide technical support and advice and guidance. One of the evaluation findings was that the circumstances in which learners were recruited very much affected individual learning outcomes since learners recruited on-line are very different to those recruited traditionally.

Learner experiences

In general learners reacted positively to the course which related to the fact that learners can see that on-line methods of learning have great advantages for adult learners. In particular, they can see that on-line learning can make learning more accessible, particularly overcoming barriers of time and place:

'The Internet can provide 24 hours per day education at home. No excuses for not continuing our education now! It's up to you'
'BBC On-line learning is excellent for widening participation and inclusive learning but wider publicity and marketing would be required'
'This On-line learning is an excellent idea and easily achievable by anyone with a little knowledge of the Internet. Support throughout from the tutor was excellent and absolutely necessary.'
'I think on-line learning could become vital for a great number of people - the disabled, those seeking work-related courses who want a better job and have limited time. ENDLESS!'

Surprisingly, learners did not experience any difficulties in gaining access to workstations nor in accessing the Internet. The technology infrastructures now available in colleges and learning centres have advanced considerably in the last two years. They provide a stable and consistent technology platform on which to deliver on-line learning. Those learners accessing the course from home or work had many more technical difficulties for which technical support was needed.

A number of learners complained that the course was "boring". This tended to be those learners who did not have any group communication provided either with the tutor or with other learners. The Web course site had an over-reliance on text-based information with limited interaction.
'I found this course to be quite boring and it took a lot of time to read the articles before answering questions.'
'We received lots of help from our tutor at college, but most of our class found the pilot boring as it was quite long. Some of the fact sheets were brilliant and I printed some off, but the weakness was too long pages which made people give up.
'I think that this course makes you aware and understand topics like breast cancer a lot better. Some of the topics make me think again. The only weakness that I found was the amount of time it took to read each topic through.'

The awards of tokens and the opportunity for accreditation was motivational. Basic skills learners found reading text information too difficult. A number of learners wanted to have a more thorough introduction to using the Internet. This was apparent because a number of learners stated that their reason for taking the course was to gain an understanding of the Internet AS WELL AS to learn more about Women's Health. This suggests that learning about the Internet should be embedded within a course context.

Some of the learners wanted to follow-up particular Women's Health topics in greater depth than was possible through the on-line course and did this for themselves with the support of the on-line tutor by using the Web Board facility provided by the College to discuss their own experiences and to paste Web site links which they had individually found. The ensuing group discussion resulting from this then became part of the learning material of course. This was a example of an effective learning community. Only one centre effectively provided group communication which was appreciated by learners:

'The course's main strength was the college tutor who continued to encourage, assess, assist and sort problems out as we progressed. This made the group feel close, although participants never actually met on a face-to-face basis.'
'A key to the success of a programme like this is the tutorial and group support. The group interaction of this course was motivating'

'I would have benefited from the feedback and support of other students. If I did another course like this, I would be looking for on-line contact with others.'

The wide variation in the experiences of learners was partly because they had different needs and expectations, partly because of the differences in the way learning centres delivered the course, and partly because the on-line course in its current form needs further work to make it interactive.

Tutors' experiences

The tutors were very similar to the learners in their response to the course, in that while they were enthusiastic about the course, they could see many ways in which it could be made more effective. Apart from one centre which delivered the course as a distance learning on-line course, tutors chose to run the course either as an "add on" or as a course in its own right and did not change their methods. They expected staff development to help them with developing new methods. Although committed practitioners, their limitations in understanding how to adapt their role for on-line learning were as a result of not having had the opportunity for staff development. Some of the tutors' difficulties come from the fact that the organisation and management of on-line learning in learning centres is very much seen as a technological rather than an educational activity.

One tutor facilitated group learning and discussion with the help of the College who set up a course Web Board - this was an electronic notice board which provided some space for social interaction between learners and some space for group discussion on specific topics enhanced by additional Web material found by both learners and the tutor. She was able to encourage learners to communicate and collaborate with each other - effectively creating an on-line learning community. However, this approach created an unacceptable workload for her, and her on-line work was not recognised by her managers. The other tutors were aware that group communication was important for the course but did not know how to facilitate this.

The tutors particularly valued the tracking system in the programme which enabled them to follow progress of individual learners, though they did comment that it sometimes took an unacceptably long time to access learner results.

Conclusion

This example of On-line learning demonstrates that use of broadcast materials via the Internet can attract and motivate new learners. However, it also creates new challenges for educators and broadcasters to develop innovative and appropriate multimedia and pedagogic design methods which fully capitalise on the advantages of this medium and embed good adult education practice - particularly the creation of learning communities.

References

Bates, P (1999) "Development of Satellite and Terrestrial Digital Broadcasting Systems and Services and Implications for Education and Training". A Study for the DGXIII C3 Telematics Applications Programme Education and Training Sector July 1999.

Fernback, J (1999). "There is a There: Notes Towards a Definition of Cybercommunity". Doing Internet Research: Critical Isues and Methods for Examining the Net. S. Jones. Thousand Oaks, Sage: 203-220.

McConnell, D (2000) Implementing Computer Supported Cooperative Learning. London, Kogan Page.

Rheingold, H (1993) Virtual Community: Homesteading on the Electronic Frontier. New York, Addison-Wesley.

Salomon, G, Perkins, D. N. (1998) "Individual and Social Aspects of Learning". Review of Educational Research 23.

Smith, M and Kollock, P. (1998) Communities in Cyberspace. London, Routledge.

European Co-operation through "Interactive Storytelling" in the European Virtual Training College

Christoph Harnischmacher/Ulrich Rauter, IMBSE e.V.

Introduction

This article on the SOCRATES project "C³. Communication, Collaboration, Community Development - Impacting Education in Networked Learning for Disadvantaged Young People" focuses especially on the relationship between Open Learning and Lernzielorientierter Unterricht in a European collaboration process. It highlights the question of compatibility of virtual classrooms and real classrooms in a learning and teaching culture of disadvantaged youths and their teachers. Looking back on our project that started at the end of '98 we try to describe a few discoveries.

Project partners from Germany, Great Britain, Italy, Spain, the Netherlands and the Czech Republic are working together in the C³ project addressing directly teachers who are working with disadvantaged young people. It tries to develop a method of Open and Distance Learning, "Interactive Storytelling", that reflects the special needs of our target groups and the different styles of teachers. Main aims are:

- Development of ODL for youth at risk
- Focus on active use of Multimedia and Internet as communication and production environments
- Establishing a European working context between institutions supporting youth at risk
- Empowering teachers to link the real classroom with virtual classrooms

Being Disadvantaged ...

What does it mean to be disadvantaged? Can we identify characteristics of a disadvantaged person? There are a lot of different characteristics that make a young person today 'disadvantaged'.

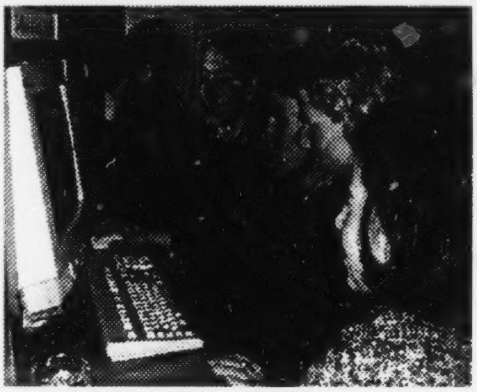


figure 1: Youth in our Chat Cafe

Firstly, I would like to underline that it is necessary to see being 'disadvantaged' in relation to the social situation of the young people and that it is not the product of personal qualities as such. As we can see, increased youth unemployment is causing greater social selection. If young people were in a position to make out clear-cut prospects with regard to their working lives even ten years ago, today they cannot have much hope of continued employment. Take a youth from Turkey living in Moers, for example. He or she comes from a family who left their home place in the sixties because the husband/father had found work in one of the mines in Moers. Today, the traditional miners' environment does not hold out any hopes for the future of these youths with regard to their working lives because mines have been closed down and miners made redundant or sent into early retirement. The Turkish youths neither possess their own indigenous Turkish cultural background nor are they fully integrated and accepted members of the German regional environment - be this language-wise or culturally. In competition with German youths they usually stand a poor chance especially since the demand of training places is much higher than the number of training opportunities on offer.

Extent social conditions and individual situations interact with each other and have a spiralling effect on the marginalisation of certain social groups. With regard to the project our different national situation is being reflected by what we individually and nationally determine as our 'disadvantaged' target groups at the local level. In this respect, too, the term 'disadvantaged' is something socially relative. We now tend to abstain from - and would request others to do the same - terming people 'disadvantaged' because of the danger of stigmatising the person concerned, i.e. project social consequences as the qualities of a person sui generis.

The Social Design

This is the complex and multi-layered social context, our project is set in. In contrast to classic ODL which appeals to a university-type learner, we find here that the learner's personality, his or her social heritage and integration is crucial to her or his personal definition of meaningful educational targets or achievements. The classic form of Distance Learning is based on the ideal learner who is intrinsically motivated and will study on her or his own account and independently. Under such circumstances Distance Learning offers the advantage of overcoming spatial distance so that subjects as well as knowledge taught, i.e. a curriculum, can be provided which would otherwise not be available locally. The official translation of 'Distance Learning' in German is 'Fernunterricht' which particularly highlights the paradigm of this type of Distance Learning as *distribution of knowledge*. Looking at the target groups, however, that we have in mind in our projects the social premises of classic Distance Learning come into focus and thus the incompatibility of this rather academic teaching model with the requirements, interests and skills of our target groups.

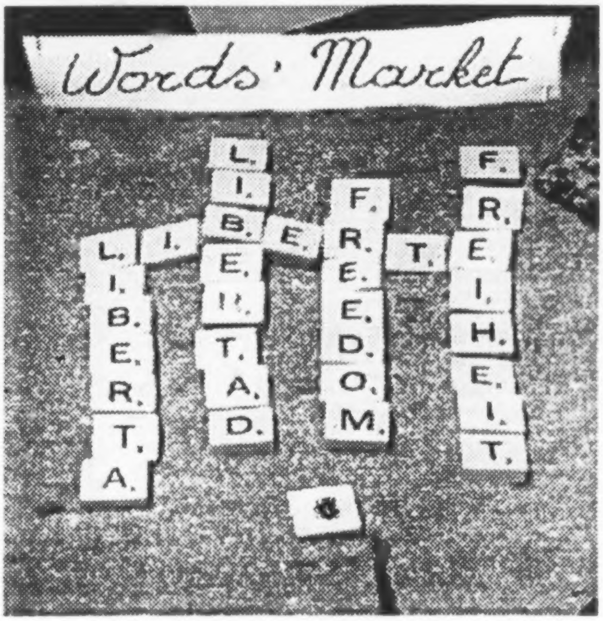


figure 2: from a story

Within the scope of the C^3 project, ODL is out more than anything else for offering a different set of subjects as well as providing an alternative to the common model of classroom learning which has to be held responsible for a number of disappointing experiences among young people.

With respect to all partner institutions, the project is based on a real and social learning context; it is rooted in the real classroom so that it would be possible to transfer the given social context into the virtual classroom. This is the fundamental thesis of the project. It reflects the fact that our young people depend on personal and social assistance as well as on motivating support and encouragement.

Another fundamental idea of the project is the conviction that today the need for pedagogical integration possesses top priority, and it is not so much lack of technical development which stands in the way of utilising modern means of telecommunication. This is the reason why we gave preference to the use of commercially available or free standard tools such as Multimedia software for stand-alone PCs and Internet tools, which would also have a favourable effect on the transfer of the project results.

BEST COPY AVAILABLE

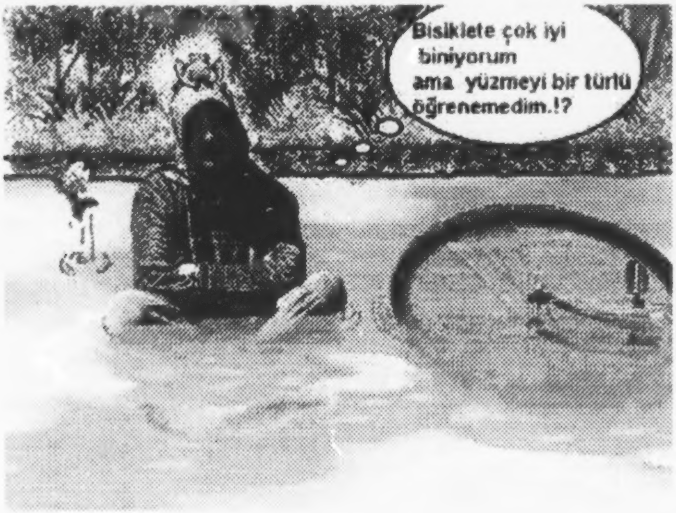


figure 3: from another story

"Interactive Storytelling" as key to ODL

In the light of the experiences working as teacher, trainer, social pedagogue etc. with young people we surely remember a lot of stories, that they had to tell. But also very often their stories was not be heard or they are only told in a peer group. This oral youth culture is a strong resource of our young people and it is worth to be shared with other people which can benefit from that. "Interactive Storytelling" is linking young peoples own life experiences with Internet and Multimedia tools (*Lambert*), sharing these stories with other young people all over Europe and to communicate them through the medium of networked communication and to develop a community of young storytellers. Basic principles are:

- Young people are constructing knowledge through sharing their experiences by telling their personal life stories.
- The individual needs and experiences of young people are in the centre of the storytelling process, nobody is telling what to write, the learner is an autonomous author.
- "Interactive Storytelling" is a mean to use Multimedia and Internet tools in a creative way, the young people are producers not consumers of content (Software Design by Learners, *Papert*, *Piesche-Blumtritt/Rauter*).
- "Interactive Storytelling" is integrative, not separating learning in different curriculum areas. It is language, arts, design, IT, math, narration etc. and much more than tool acquisition.
- The young people are planning running and evaluating their storytelling process by themselves.
- They are able to share and discuss their stories in a cross-border European network of young people (Shared Constructionism, *Resnick*).

Teacher Training

Based on the pilot experiences of cross-border co-operative learning for disadvantaged young people by means of Multimedia and the Internet within the framework of the former EVA project, the C³ project now analyses the new roles of teachers/instructors within the new pedagogical concept of cross-border co-operative learning. The C3 project is designed to develop a model of further training for

BEST COPY AVAILABLE

ODL. The target group comprises European educational/training institutions and their pedagogical staff who work with so-called disadvantaged young people within the framework of prevocational courses. During the first project year (9/98 - 8/99), the focus is on institutions directly involved with the project. The second project year (9/99 - 8/00) addresses outside participants who will have to be enrolled for the training.

The results of the project will make a curriculum model, i.e. a manual for co-operative ODL based on 'Interactive Storytelling', as well as a presentation model in the form of a manual to prepare pedagogical staff for their new roles in the Virtual Classroom.

The organisational and specific implementing of the training will itself be carried out according to the principles of Open Learning. On the one hand, this will give rise to demanding challenges with regard to the structuring of the courses and, on the other hand, facilitate individual ways of realisation on the part of those involved, making effective communication imperative.

The further training is designed to help pedagogical staff understand ODL in social a context and to assist them with regard to the implementing of these in their all days work. Practical projects with young people will thus serve the purpose of putting into practice what has been learned. During their further training the pedagogues will learn the following:

- develop contents;
- work out the structure of a story;
- produce an esthetical code;
- be authentic in their own productions in order to be able to permit authenticity;
- communicate and stimulate communication;
- learn the application of software tools.

Conclusion

From our projects we learned that the concern of the teaching staff about their lack of confidence having to employ a technique they did not master in the same way as they were used to in respect of previous matters and methods: The teaching staff saw their lack of confidence as qualification deficits in view of mastering a technique. Our evaluation described the situation as uncertainty on the part of the teaching staff who found it difficult to accept their state of uncertainty. Thus a basic social competence was highlighted which is essential in Open Learning and which students and staff will have to try and acquire together (*Sesink*).

Coming to an end, we would like to stress once again to be aware of including the new media in social interactions. It is necessary for us to leave behind the abstract image of a homo educandus who in view of her/his lack of social and motivational concreteness is fiction and could best be compared - if at all - to a real-life university student. Here it appears to be of special interest to round off our picture of learning cultures from an ethnographic perspective. We are of the opinion that today provision of learning environments have become technically essentially easier for the Internet than have the development of sustainable and dynamic learning arrangements which try to integrate the Internet and which are in agreement with the interests and educational backgrounds of people in their every-day situations and in their social diversity.

Refenrences

HAREL, IDIT/PAPERT, SEYMOUR): SOFTWARE DESIGN AS A LEARNING ENVIRONMENT. IN: INTERACTIVE LEARNING ENVIRONMENTS I. NORWOOD NJ 1970. S. 1 –32

Harnischmacher, Christoph/Märsch, Friedhelm (1998): The European Virtual Training College Guide. Moers

Lambert, Joe (o.J.): Digital Storytelling. How we all can become new media content producers in the 21st Century. [Online] Available: http://www.digiclub.org/digistory

Palloff, Rena M./Pratt, Keith (1999): Building Learning Communities in Cyberspace. Effective Strategies for the Online Classroom. San Francisco

Piesche-Blumtritt, Franz/Rauter, Ulrich: Multimedia: Gestaltungswerkzeuge in der Benachteiligtenförderung. In: BWP 24/1995/1, S. 37 - 44

Resnick, Mitchel (1996): Distributed Constructionism.. [Online] http://el.www.mit.edu/groups/el/pap...es/Distrib-Construc/Distrib-Construc.html

Sesink, Werner: Zwischenbericht zur Evaluation des SOCRATES-Projekts "Europäische Virtuelle Arbeitsschule" 1996/97. Unveröffentlichtes Manuskript. 1997

Provisional stabilities for change in Learnet :

bridging tools for transforming learning cultures

Bernadette Charlier
Joel Bonamy
Murray Saunders
March 2000

Abstract

The experience of LEARN-NETT has produced some significant learning points for the development of collaborative cross institutional learning using the new ICTs as a resource. We have been very influenced by theory which suggests ways of managing highly complex change environments. LEARN-NETT is just one such environment. Not only does the use of ICTs for learning involve some significant challenges for single institutions because of its communicative and informational scope, but its use in an international experiment as in LEARN-NETT has *cross cultural system integration* as an additional dimension. Fullan's ideas on complexity theory suggest the need to accept complexity or diversity as a given in the design of a change process. The lessons from this first phase of LEARN-NETT give weight to this view. We have attempted to demonstrate that to insist on absolute conformity or to develop an over prescriptive framework is a mistake. Instead, we have taken the view that we should look for the maximum opportunity for participating sites to express their own organisational stage of development in their participation in LEARN-NETT with some strong advice about the 'core' elements required. This does however, throw up some difficult design challenges from which we can take our thinking a little further.

As we move across this 'boundary' between the traditional and the post-traditional, we see a need for a wide range of bridging tools to help learners and those supporting them to navigate the transition. Our understanding of the term 'bridging tools' is guided by a specific learning theory. Involvement in a research or development project, funded or otherwise, produces learning through the development of *new* communities of practices. Individuals and groups learn through the adoption of new practices and this process is active, situated and context bound but essentially reflective. However, how might this learning be made accessible and useful to others? We argue here that captured rehearsals, examples, vignettes, cases, accounts, i.e. making the tacit explicit, can evoke the experience of boundary crossing and provide provisional stability for change. Provisional stability is the term we have coined to refer to circumstances which allow for a degree of stability necessary in order to move from anomic and destructive instability to a new framework for action.

By giving insights and clues to others' experience of change for those about to engage in the process it could support them in building their own experience.

1. Introduction

Our paper is based on the experience of an ODL setting called Learn-nett[1]created in the context of Socrates. It aims at bringing together groups of students from diverse universities in a collaborative distant Learning project.

The Learn-nett experience brings together participating sites that have education and learning characteristics which differ greatly in terms of knowledge domains and subjects, levels and types of assessment, mode of relationship of the experience with existing courses and learning environments, etc. One option for Learn-nett was to take into account the complexity of joint working by identifying areas in which all sites should be able to achieve common aims while providing openness in areas in which sites were operating under diverse constraints.

Introducing ODL at the same time when traditional constraints are still present, obliged participating sites to go out of a relatively stable and 'known' situation and pursue aims and objectives that were less defined. In this change or transition phase, many contradicting dimensions appear when traditional and new practices have to work together (distant and 'face to face' relations, collaborative and more traditional learning practices, new positions and status of tutors, new status of knowledge in collaborative practices and, implicitly, some degree of competition between institutions). Reflecting on change in institutions, especially those introduced by the use of ITCs, we have developed the hypothesis that in such a phase of transition, new rules are not yet established and a state analagous to that of 'anomie' at the level of the individual, the group and institution can develop. In other words, what happens in educational institutions in which rules and practices are well established and validated when a new event or intervention occurs that disrupts (changes radically) these traditional practices ? Instead of the psycho-social notion of "resistance to change", we think that the theory of Durkheim and followers[2] [which have focussed on the disorders in times of social change] may be of use to interpret situations in which change or the will to change creates conflicting systems of rules and phenomena of social disorganisation[3].

In the transition from one state of relative stability to another, where conditions of stability are not determined, it is necessary to build tools of reference (bridging tools) that help create a framework for action. The Learn-nett experience helps to think of some of these tools that give a better predictability. We argue that instead of trying to reduce the complexity of collaborative activity by searching for common solutions (optimum LEARN-NETT planning) and thus searching for a stable framework that could constrain creative change, we prefer to suggest a framework that will help each partner both existing and the forthcoming to create his/her own *provisional* stability for change.

---

[1] . Learn-nett [Learning Network for Teachers] consistes of the following institutions
Facultes Universaires Notre Dame de la Paix, Belgium, Universidat de Barcelona, Universite de Geneve, Universite libre de Bruxelles, Universite Lyon, University of Lancaster

[2] . • É. DURKHEIM, *De la division du travail social* , 11^e éd., P.U.F., 1986 ; *Le Suicide, étude de sociologie, ibid.* , rééd., 1980
• R. K. MERTON, *Social Theory and Social Structure* , rééd. Free Press, New York, 1968
• T. PARSONS, *Essays in Sociological Theory* , éd. rev. et corr., Glencoe (Ill.), 1954
• W. I. THOMAS & F. ZNANIECKI, *The Polish Peasant in Europe and America* , New York, 1927, rééd. Univ. of Illinois Press 1984.
• FULLAN M Change Forces, the Sequel London Falmer Press 1999.

[3] . Anomic conditions can result from :
- contradictions between aims determined by institutions and means that are not given to those who have to realise them (Robert K. Merton).
- social disorganisation characterised by no defined aims ; incertain criteria for practices ; conflictual expectations; lack of references to well established symbols (Parsons).

2. Change dimensions and adaptation requirements

We will begin by describing the diverse situations of participating sites to highlight how change is perceived by participants and the adaptative requirements they have identified.

The diversity of the partners' experiences could be described on two axis : the extent to which students are involved in the experience (a group of volunteers or all students of a site) and the degree of integration of LEARN-NETT into the existing course structure (normal course structure or special conditions offered to support the student's participation). Thus three typical cases appeared.

Case 1. **One group of volunteers with special conditions**

The main adaptations observed focus on :

- the time investment of either the students and the tutor[4] ;
- the coaching by an animator on the university site ;
- the flexibility of the course schedule and accessibility to the computer room ;
- the organisation of regular meeting with the students that allows for course regulations.

The main problems and / or questions raised by this situation are :

- the cost of the experiment according to the personal investment and the accessibility offered to the computer room;
- the acceptability of the differences between students according to the learning conditions : students of the same course have had different learning conditions but have the same assessment mode.

Case 2. **One group of volunteers in the normal course structure**

The main difficulties arising from this situation were :

- The dislocation between the academic schedule with other partners ;
- The ill adapted traditional assessment mode to the objectives of LEARN-NETT :

Case 3 **All the students in the normal course structure**

LEARN-NETT has allowed to explore and test a new teaching method and this opportunity open numerous interests.

But LEARN-NETT also created difficulties :

---

[4] In LEARN-NETT, we use the word tutor to designate the trainer who coach the students at a distance and animator the trainer who is responsible for a group of students in one university (Face to Face). The « academic » is the university teacher in charge of the course.

- organisation of the course (technical preparation and accessibility to the computers and to the animators outside the normal hours) ;
- level of the demand of the students ;
- a changing role for the academic in the tutor role.

These cases highlight the main dimension concerned with the implementation of LEARN-NETT in a traditional teaching environment :

- the management of space and time ;
- the revision of the role of the teacher who acts as tutor ;
- the investment (in time, resources, flexibility) of the students and the tutor ;
- the reflection requested on the assessment mode.

To summarise this description, we can say that change and adaptation are a function of the matrix of diversity in the the implementation of LEARN-NETT in institutions. The main elements to be considered are :

- relationships with existing courses and learning environment
- differing knowledge domains and subjects
- levels and types of assessment
- the use of time and time boundary for learning.
- the different roles of academics, tutors and animators
- degree of course regulation

3. Provisional stability for navigating the transition

The evidence of the case studies suggest that it is possible to develop a common framework for LEARN-NETT activity within existing organisational structures, at least in the short to medium term. The requirements are that LEARN-NETT is understood as a learning process or method which can be associated with any knowledge base, discipline or subject matter. The organisational changes are mainly at the level of the 'course' or sub organisational unit rather than at the meso or whole organisational level. The question is how does a learning environment which has the characteristics of LEARN-NETT connect with existing forms of organisation ? It is important to establish this so that interim or provisional stability can be sustained in the context of changes which might be far reaching in the longer term.

The following learning points identified by participants in LEARN-NETT were considered in this model

- students were inexperienced in collaborative learning and technical expertise
- process rather than product was emphasised which challenged academic practice
- technical expertise is rapidly transferred to other learning opportunities
- collaborative learning across systems is difficult
- students and tutors roles/obligations need to be specified
- interactive planning is required
- at this stage participation should be voluntary

We have demonstrated how diverse the participating sites are and how they exhibited different levels of organisational 'comfort' with the changes implicit in LEARN-NETT. Change from a rather stable situation (stable traditional set of academic practices associated with reading writing and texts framed by values and norms) to a more unpredictable environment may create different levels of organisational 'comfort'. Participants felt at ease or were able to accommodate easily the following elements of course provision within their current frames of thinking or organisational constraints :

-validation and assessment specifications
-skill developments in the use of ICTs
-networking possibilities.

However, other aspects might challenge participants' existing organisational frames or ways of thinking, namely :
-reconfiguring process and content in curriculum design
-reconfiguring tutors' roles and responsibilities
-reconfigure learner's responsibilities
-minimum skill requirements in order to access learning resources
-reconfigure the use of time and resources within existing -frameworks
-minimum skill requirements in order to access learning resources + developing 'solid' frameworks for action with maximum internal flexibility

This realisation suggests a framework which attempts to create stability by encouraging individual sites to design learning experiences which reflect their own interim constraints but provides a 'core' framework of characteristics which give LEARN-

NETT an identity. This framework might be expressed in terms of *constant* and *variable* elements.
Constant elements encompass :

- Specification of desired learning constraints
- High levels of learner decision making on learning focus
- Tutors role of facilitation rather than instruction
- Learning in a team environment
- Technical infrastructure and training in place
- Time allocations for group formation, goal identification, method, division of labour etc.

But other dimensions were let free and variable among the sites :

- Knowledge content
- Assessment specifications including moment of assessment
- Time allocation to learning periods
- academic product
- learner characteristics

This combination of characteristics is based on the experiences of the participating sites. It takes into account the complexity of joint working by identifying areas which all sites should be able to achieve in common while providing openness in areas in which sites were operating under diverse constraints.

To illustrate this point let us take the areas of timing and assessment which were particularly difficult to coordinate across sites so they have been left 'open'. This means that LEARN-NETT will involve the challenge of designing collaborative projects and learning support which enables teams [tutors and learners] to participate for variable amounts of time and to be assessed by different methods within organisationally diverse requirements. -Clearly, in present circumstances, assessment will be the ultimate responsibility of the learners' home institution. However, it may be possible for tutors from other institutions to offer assessment suggestions. The status of tutors from other institutions is also problematic. At present, if we take Lancaster for example, tutors are required to be vetted by a validation committee if they are formally appointed . It is likely that all institutions in the LEARN-NETT project have similar requirements. In the LEARN-NETT project we need to see tutors as a learning resource rather than a tutor in the formal or traditional sense to avoid this problem.

The timing of participation in a team has proved difficult for all sites. We suggest therefore that we design team projects in which different time commitments are an integral design feature. This means that learners from different institutions will be involved at different moments in a group project. This enables them to complete aspects of a project within an overall design which has a longer 'life' than any particular individual or sub group. This would allow the possibility for different elements to be assessed within an overall team product

These illustrations demonstrate the need for some intensive planning and negotiations at the outset of project formation.

4. Creating Provisional Stability for Change : Bridging tools, a manifesto

1. The context we are considering is the rapid change in knowledge, knowledge building, knowledge circulation and use created by the transformation in ICTS.
2. In the educational sector we understand these changes as a movement away from a relatively stable traditional set of academic practices associated with reading writing and texts framed by values and norms such as the exclusivity of knowledge and knowledge holders/gate keepers, certain educational institutions, standard assessment, stable curricula, predictable and stable forms of knowledge and transmission, inaccessibility of certain knowledge types, literary capability, theoretical knowledge as a opposed to 'practical knowledge' etc.
3. The key intervention in this hitherto stable environment is the rapid adoption of the assumption and in many cases actuality of the power of ICTs to transform learning practices.
4. We argue that this intervention is essentially creating anomic conditions in the educational environment in which the potential of the technology is in tension with traditional practices i.e. the adoption of a variety of experiments in learning technologies have resulted in frustrating experiences in which traditional learning practices have produced paradoxical outcomes. Learning is rarely free from the time, space and expert constraints ICTS might promise. There is a breakdown in traditional expectations of learning and education, with no common or shared view/perspective of what the new norms and practices might be. As we move across this 'boundary' between the traditional and the post-traditional, we see a need for a wide range of bridging tools to help learners and those supporting them to navigate the transition.
5. Our understanding of the term 'bridging tools' is guided by a specific learning theory. Involvement in a research or development project, funded or otherwise, produces learning through the development of *new* communities of practices. Individuals and groups learn through the adoption of new practices and this process is active, situated and context bound but essentially reflective. However, how might this learning be made accessible and useful to others? We argue here that captured rehearsals, examples, vignettes, cases, accounts, i.e. making the tacit explicit, can evoke the experience of boundary crossing and provide provisional stability for change. Provisional stability is the term we have coined to refer to circumstances which allow for a degree of stability necessary in order to move from anomic and destructive instability to a new framework for action by giving insights and clues to others' experience of change for those about to engage in the process.

Technology, Lancaster University

The aim of CSALT is to provide a focus for research in advanced learning technology (ALT), a field in which Lancaster University has a well-established international reputation.

The Centre is multi-disciplinary. Its members bring a variety of research perspectives to bear on the complex issues surrounding the design and use of learning technologies. Its members have expertise in education, computing, psychology, management, instructional design, courseware production methods and evaluation.

The Centre carries out basic and applied research. Its members are also closely involved in the education and professional development of workers in the ALT industry, and in consultancy.

Web Site : http://csalt.lancs.ac.uk/csalt

Centre for the Study of Networked Learning and Department of Educational Studies, University of Sheffield.

The University of Sheffield's Centre for the Study of Networked Learning was established in 1996. It is a multi-disciplinary centre with members from a variety of university departments. We are interested in research and development work in teaching and learning as it relates to the Internet and the Web, especially in the area of lifelong learning and professional development via the Internet. We offer an innovative two year, part time Masters in Education programme in Networked Collaborative Learning, which is run via the Internet.

Web Site : http://www.shef.ac.uk/uni/projects/[illegible]

ISBN : 0 902831 38 0